



Electrifying Mobility in Cities: Investing in the Transformation to Electric Mobility in India

Part I: Project Information

Name of Parent Program

Global Programme to Support Countries with the Shift to Electric Mobility.

GEF ID

10276

Project Type

FSP

Type of Trust Fund

GET

CBIT/NGI

☐ CBIT

☐ NGI

Project Title

Electrifying Mobility in Cities: Investing in the Transformation to Electric Mobility in India

Countries

India

Agency(ies)

UNEP, ADB

Other Executing Partner(s)

Energy Efficiency Services Ltd. (EESL), National Institution for Transforming India (NITI) Aayog

Executing Partner Type

Government

GEF Focal Area

Climate Change

Taxonomy

Stakeholders, Focal Areas, Climate Change, Climate Change Mitigation, Sustainable Urban Systems and Transport, Influencing models, Strengthen institutional capacity and decision-making, Demonstrate innovative approaches, Transform policy and regulatory environments, Type of Engagement, Information Dissemination, Participation, Consultation, Civil Society, Academia, Non-Governmental Organization, Communications, Education, Public Campaigns, Behavior change, Awareness Raising, Private Sector, Individuals/Entrepreneurs, SMEs, Capital providers, Large corporations, Financial intermediaries and market facilitators, Gender Equality, Gender results areas, Access to benefits and services, Gender Mainstreaming, Beneficiaries, Women groups, Capacity, Knowledge and Research, Innovation, Knowledge Exchange, Capacity Development, Learning, Convene multi-stakeholder alliances, Deploy innovative financial instruments, Partnership

Rio Markers**Climate Change Mitigation**

Climate Change Mitigation 2

Climate Change Adaptation

Climate Change Adaptation 0

Submission Date

8/1/2020

Expected Implementation Start

11/30/2021

Expected Completion Date

11/30/2025

Duration

48In Months

Agency Fee(\$)

483,024.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CCM-1-2	Promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technology and electric mobility	GET	5,366,976.00	162,780,000.00
Total Project Cost(\$)			5,366,976.00	162,780,000.00

B. Project description summary

Project Objective

To enable the GoI and relevant stakeholders to make the transformative shift to de-carbonize transport systems, catalyse access to finance for a large-scale adoption of EV across vehicle segments and reduce air pollution in cities by promoting scale-up of electric mobility(1) in India. 1- Electric Mobility (e-Mobility) / Electro mobility (or e-Mobility) represents the concept of using electric powertrain technologies, in-vehicle information, and communication technologies and connected infrastructures to enable the electric propulsion of vehicles and fleets. Here the electric powertrain replaces the conventional Internal Combustion Engine and transmission with a battery powered electric motor. Conventional gasoline fuel is replaced by battery packs and electricity stored in it.

Project Component	Financin g Type	Expected Outcomes	Expected Outputs	Trus t Fun d	GEF Project Financing(\$)	Confirmed Co- Financing(\$)
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Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 1: Integrated EV policy and framework for the e-mobility transformation	Technical Assistance	Outcome 1: Government institutionalizes integrated e-Mobility national policy framework and facilitates effective implementation of increased e-vehicle infrastructure, including its measurement and monitoring in Cities (UNEP)	<p>Output 1.1: Integrated National Policy Framework with inclusive (Elderly, Women, Children and Differently abled) EWCD features to guide transformation to e-Mobility developed and operationalized for adoption by identified Government Authorities</p> <p>Output 1.2: City e-Mobility and charging infrastructure plan developed for City Administration and integrated with urban development and planning processes for cities</p> <p>Output 1.3: Methodology and data needs for estimating GHG reductions developed for Cities</p>	GET	915,500.00	250,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 2: Environment and Resource Use Management Framework for Batteries	Technical Assistance	Outcome 2: Policy for Lithium-Ion Battery (LIB) reuse and recycling and battery standards for EVs endorsed by the Government (UNEP)	<p>Output 2.1: Market and policy assessments conducted and policy for Lithium-Ion Battery (LIB) reuse and recycling drafted and shared with MoEFCC for adoption</p> <p>Output 2.2: Battery standards for EVs, including for retrofitting, battery swapping and battery leasing developed and notified by identified Government Authorities for adoption by industry</p>	GET	453,000.00	60,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 3: Enabling scale up of e-vehicle markets through pilot demonstrations	Technical Assistance	Outcome 3: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level (ADB)	Output 3.1: Market assessment, charging infrastructure plans, business models and financing applications developed and disseminated to city authorities and public and private entities	GET	1,206,750.00	820,000.00
Component 3: Enabling scale up of e-vehicle markets through pilot demonstrations	Investment	Outcome 3: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level (ADB)	Output 3.2: Pilot sub-projects implemented establishing business model (2W, 3W & 4W) for further investments by public and private entities and financing institutions	GET	1,795,093.00	160,900,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 4: Gender-sensitive capacity development and raising awareness for growing e-mobility	Technical Assistance	Outcome 4: Demand for e-vehicles stimulated through increased capacity and awareness among government, consumers and private sector stakeholders on the benefits and business opportunities for accelerating electric mobility uptake (UNEP)	<p>Output 4.1: Capacity enhanced among policy makers on considering gender mainstreaming and EWCD considerations in the e-Mobility sector</p> <p>Output 4.2: End-users education and awareness on low-carbon transportation enhanced in urban areas</p> <p>Output 4.3: Drivers, Service Technicians and Financing Institutions trained for strengthening EV services and access to finance,</p> <p>Output 4.4: Institutional capacity developed at Central, State and City government officials levels to improve coordinated planning and actions monitoring with private/industry support</p>	GET	676,063.00	250,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Monitoring and Evaluation	Technical Assistance	Monitoring and Evaluation	Monitoring and Evaluation	GET	65,000.00	
Sub Total (\$)					5,111,406.00	162,280,000.00
Project Management Cost (PMC)						
	GET		255,570.00		500,000.00	
Sub Total(\$)			255,570.00		500,000.00	
Total Project Cost(\$)			5,366,976.00		162,780,000.00	

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
GEF Agency	Asian Development Bank	Loans	Investment mobilized	31,800,000.00
Recipient Country Government	Energy Efficiency Services Ltd (EESL)	In-kind	Recurrent expenditures	1,320,000.00
Recipient Country Government	Energy Efficiency Services Ltd (EESL)	Equity	Investment mobilized	129,100,000.00
Recipient Country Government	Ministry of Housing and Urban Affairs (MOHUA)	In-kind	Recurrent expenditures	500,000.00
Other	Attero REcycling Private Ltd	In-kind	Recurrent expenditures	60,000.00
Total Co-Financing(\$)				162,780,000.00

Describe how any "Investment Mobilized" was identified

The investment was mobilized through the Asian Development Bank (ADB) country operations business plan (COBP) for India, 2020-2022. The COBP is well aligned with the Country Partnership Strategy (CPS), which aims to support India in accelerating its inclusive economic transformation. The COBP, linked to the energy sector priorities for the country, has been endorsed by the Government of India. Energy Efficiency Services Limited (EESL) investment was identified as investment by EESL to support e-mobility scale up in India as part of Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) program of Government of India. Energy Efficiency Services Limited (EESL) investment was identified as part of EESL's efforts to support e-mobility scaling up in India as part of Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) program of Government of India. Under Indian regulations, counterpart Government bodies are required to co-finance a defined percentage of externally-financed loans.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
ADB	GET	India	Climat e Change	CC STAR Allocation	3,220,185	289,815
UNEP	GET	India	Climat e Change	CC STAR Allocation	2,146,791	193,209
Total Grant Resources(\$)					5,366,976.00	483,024.00

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required

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PPG Amount (\$)

68,808

PPG Agency Fee (\$)

6,190

Agency	Trust Fund	Country	Focal Area	Programmin g of Funds	Amount(\$)	Fee(\$)
UNEP	GET	India	Climat e Change	CC STAR Allocation	68,808	6,190
ADB	GET	India	Climat e Change	CC STAR Allocation		
Total Project Costs(\$)					68,808.00	6,190.00

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)	0	0.201	0	0
Expected metric tons of CO ₂ e (indirect)	0	101.973	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)				
Expected metric tons of CO ₂ e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO ₂ e (direct)		0.201		
Expected metric tons of CO ₂ e (indirect)		101.973		
Anticipated start year of accounting		2027		
Duration of accounting		8		

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)		1,136,170,015,860		

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)
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Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female		2,800		
Male		5,700		
Total	0	8500	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

Project Core Indicator 6 Greenhouse Gas Emissions Mitigated (metric tons of CO₂e)
Expected at CEO Endorsement ? 1.15 ktCO₂e by 2027 from e-2 Wheeler (considering the end of life of the vehicle as 6 years) ? 9.27 ktCO₂e by 2027 from e-3 Wheeler (considering the end of life of the vehicle as 6 years) ? 190.1 ktCO₂e by 2032 from e-cars (considering the end of life of the vehicle as 10 years) ? Total direct emission mitigation: 201 ktCO₂e (by 2032) ? Total secondary direct emission mitigation: 43,703 ktCO₂e (by 2035) ? Total indirect emission mitigation: 101,973 ktCO₂e (by 2035) ? 16 TJ by 2027 from e-2 Wheeler (considering the end of life of the vehicle as 6 years) ? 148 TJ by 2027 from e-3 Wheeler (considering the end of life of the vehicle as 6 years) ? 3117 TJ by 2032 from e-cars (considering the end of life of the vehicle as 10 years) ? Total direct energy savings: 3281 TJ (by 2032) ? Total secondary direct energy savings: 486,930 TJ (by 2035) ? Total indirect energy savings: 1,136,170 TJ (by 2035) Core Indicator 11 Number of Direct Beneficiaries disaggregated by gender as co-benefit of GEF investment Estimated number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment through various deliverable based activities such as webinars, workshops and training modules and IEC (Information, Education and Communication) materials developed: Expected at CEO Endorsement Women- 2800(*) , Men- 5700, Total- 8500 Additionally, under Co-finance, EESL would be deploying additional 2000 Electric 4W and disseminating training to the drivers and service technicians. The detailed calculations for GHG emissions reduction are undertaken using the common methodology developed for the Global E-Mobility program. The model has been reviewed and validated with experts. Annex M contains detailed methodology explanation and assumptions used for the calculation of GHG emissions reduction. *In the targeted campaigns and trainings the women participation has been kept

40%, in webinars and workshops, 10% women participation has been considered. This assumption is based on Census of India, 2011 data on the female workforce participation (15.4 % urban female workforce participation rate and 30% rural female workforce participation rate).

Part II. Project Justification

1a. Project Description

1a. Changes in project design

The Objective and Component of the project remain the same as outlined in the Child Project concept submitted with the Programme Framework Document (PFD). The component titles are now more aligned with the component titles for the PFD but there is no substantive change to the deliverables of the components. The language on the outcomes has also been modified to more accurately reflect the state that is being attempted as a result of project intervention

During PIF preparation an ADB loan to EESL was being designed, from which \$250 million was being considered for e-vehicles and charging infrastructure. During project preparation it was confirmed that loan discussions between ADB and EESL had evolved such that the funds borrowed by EESL from ADB would have increased focus on other energy efficiency markets, including buildings, smart meters, smart appliances etc. The finalized loan now allocates \$ 31.8 million towards electric vehicles (4w) and associated charging infrastructure. EESL is raising funds for other sources in the order of 129.1 million, to complement the financing for electric vehicles and charging infrastructure. EESL has projected to deploy 2,000 additional electric cars (they already have deployed around 1500 e cars by 2021), with no specified target for charging infrastructure, given that NTPC, POWERGRID, DHI and private sector are also investing in this segment.

As mentioned above, there are not any substantive changes made to the components, outcomes, and outputs. The modification/ changes in the wording below are attributed to the inputs and suggestions from the various stakeholder consultations in India.

Child Project elements affected	Changes
Component 1: Integrated electric vehicles (EV) policy and regulatory framework for the e-mobility transformation	The Component has been reworded as: Integrated EV policy and framework for the e-mobility transformation
Component 2: Environment and resource use management framework for E-vehicles production, use and disposal	The component has been reworded as: Environment and Resource Use Management Framework for Batteries
Component 3: Enabling conditions scale-up of investments in e-vehicle markets	The component title has been reworded as: Enabling scale-up of e-vehicle markets through pilot demonstrations

Outcome 1: Policies and capacities for e-mobility enabled for market transformation	Outcome 1 has been reworded as: Government institutionalizes integrated e-Mobility national policy framework and facilitates effective implementation of increased e-vehicle infrastructure, including its measurement and monitoring in urban areas for Cities
Outcome 2: Conditions for Environmentally sound management of batteries created.	Outcome 2 has been reworded as: Policy for Lithium-Ion Battery (LIB) reuse and recycling and battery standards for EVs endorsed by the Government
Outcome 3: Markets stimulated for scaling up EVs and charging infrastructure	Outcome 3 has been reworded as: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level
Outcome 4: Capacity developed across the EV supply chain and awareness created among consumers on economic and environmental benefits of e-vehicles	Outcome 4 reworded as: Demand for e-vehicles stimulated through increased capacity and awareness among government, customers and private sector stakeholders on the benefits and business opportunities for accelerating electric mobility uptake

1b. Project Description

1) **Global environmental and/or adaptation problems, root causes and barriers that need to be addressed**

Global environmental problem :

A global transition to low- and zero- emission mobility is essential to meet international climate commitments, including the Paris Climate Agreement. The transport sector is currently responsible for approximately one-quarter of energy-related carbon dioxide emissions[1]¹; this is expected to grow by 2050. Besides, the transport sector is a leading contributor to short-lived climate pollution, especially black carbon.

The global vehicle fleet is set to double by 2050, and almost all this growth will take place in low- and middle-income countries. By 2050 two out of three cars will be found in developing countries[2]². This means that achieving global climate targets will require a shift to zero-emissions mobility in all countries, including low- and middle-income ones.

Air pollution, including related emissions from the burning of fossil fuels, is a major obstacle to sustainable development, particularly in mega-urban agglomerations in India. According to the latest [World Air Quality Report](#) March 2020, 6 of the world's 10 most polluted cities are in India, with Ghaziabad (part of National Capital Region of Delhi) at the top of the list. India is the world's third-largest emitter of GHGs (after China and the US) and its emissions increased by 180% from 1990-2014. Under the transport sector^[3], road transport alone accounts for around 90% of the GHG emissions, mostly to and from urban clusters. International Energy Agency (IEA) estimates that energy use for transport in India is expected to grow at 5.5% annually, due in large part to growth in vehicle ownership, which is expected to reach 400 million by 2030, from 140 million in 2011. India has committed through its Nationally Determined Contribution (INDC) towards the Paris Agreement to reduce its GHG intensity by 33-35% by 2030, using 2005 levels as baseline. Transformation to e-mobility will contribute significantly to achieving this goal.

The increase in the number of vehicles will also come with an increase in associated air pollution. The pollution from vehicles is mostly due to discharge like CO, unburnt hydrocarbons (HC), Lead (PB), Nitrogen Oxides (NOx), Sulphur Oxides (Sox) and Suspended Particulate Matter (SPMs). Vehicles in major metropolitan cities are estimated to account for 70% of CO, 50% of HC, 30-40% of NOx, 30% of SPM and 10% of SO₂ of the total pollution load of the cities. These high levels of pollutants are mainly responsible for respiratory, cardiovascular, and other air pollution-related ailments. Following a National Air Quality Monitoring Programme (NAMP) study, the Central Pollution Control Board (CPCB) issued a set of measures to mitigate air pollution in major cities like New Delhi & National Capital Region (NCR), including control and mitigation measures related to vehicular emissions. These measures were extended for implementation in other cities where particulate matter levels have exceeded permissible levels for five years and will be prioritized under the National Clean Air Program (NCAP) for non-attainment cities.

Global environmental and/or adaptation problems, root causes and barriers that need to be addressed

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concluded that evidence of warming is unequivocal and is caused primarily by human activities. Evidence suggests that the global mean temperatures could increase by between 1.4 and 5.8 degrees Celsius by 2100^[4].

A key source of contribution to global warming is energy consumption. Global energy consumption grew by 2.3% in 2018, nearly twice the average rate of growth since 2010, driven by a robust global economy as well as higher heating and cooling needs in some parts of the world. As a result of this, global energy-related CO₂ emissions increased to 33.1 GtCO₂e, up 1.7%^[5]. It was the highest rate of growth since 2013, and 70% higher than the average increase since 2010. CO₂ emissions were stagnated during 2014 to 2016 due to substantial energy efficiency improvements and low-carbon

technology development. However, dynamics are changing in the last two years, as 'higher energy productivity' and 'low carbon options' did not scale fast enough with higher economic growth.

The Transport sector is one of the biggest growing contributors to the energy demand growth, in addition to the power sector (coal-fired power generation), industries (steel, cement, aluminium, etc.), forestry and others. Over the past decade, transport's GHG emissions have increased at a faster rate than any other energy sector. The transport sector produced ~8.0 GtCO_{2e} of total emissions in 2016 (71% higher than 1990) and hence was responsible for approximately 25% of total energy-related CO₂ emissions.

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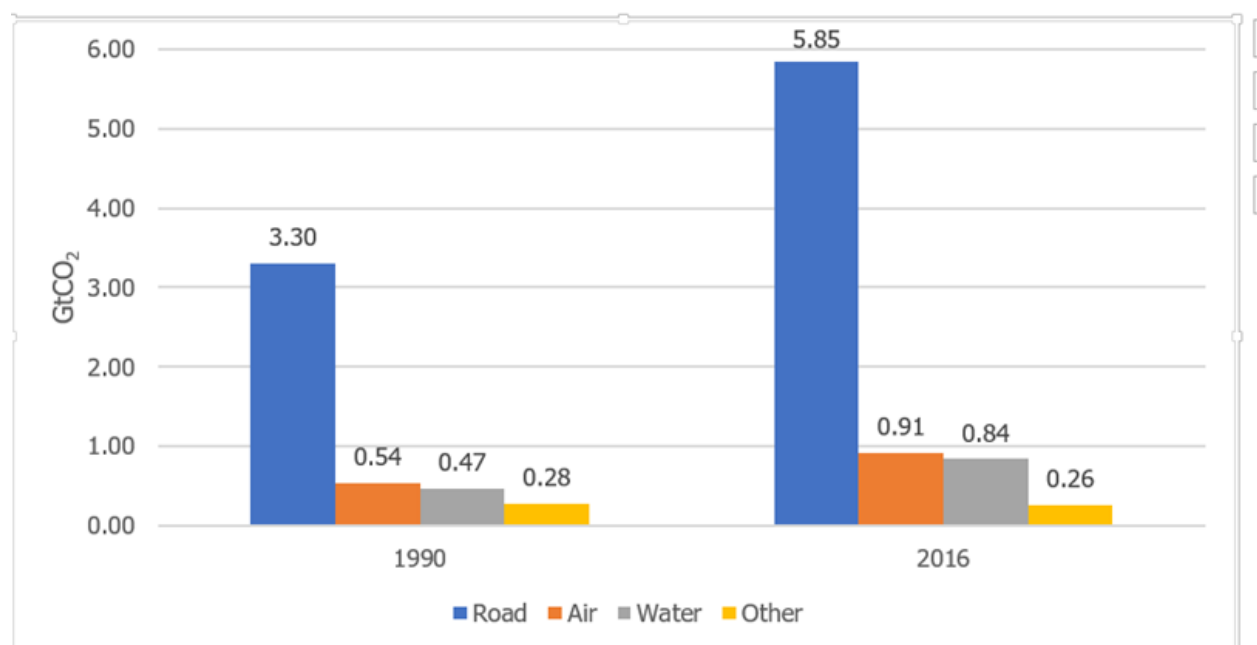


Figure 1. Global CO₂ emissions by Transport sub-sector

Road transport accounts for about 2/3rd of transport emissions. The share of road transport emission increased by two percentage points to 74%^[6]; while contributions from other modes of transport remained unchanged. This is an alarming situation and reducing these emissions is an important part of the climate change mitigation programs. Without implementing sustainable mitigation policies, transport emissions could increase at a faster rate than emissions from the other energy end-use sectors and reach around 12 GtCO₂e^[7] by 2050^[8].

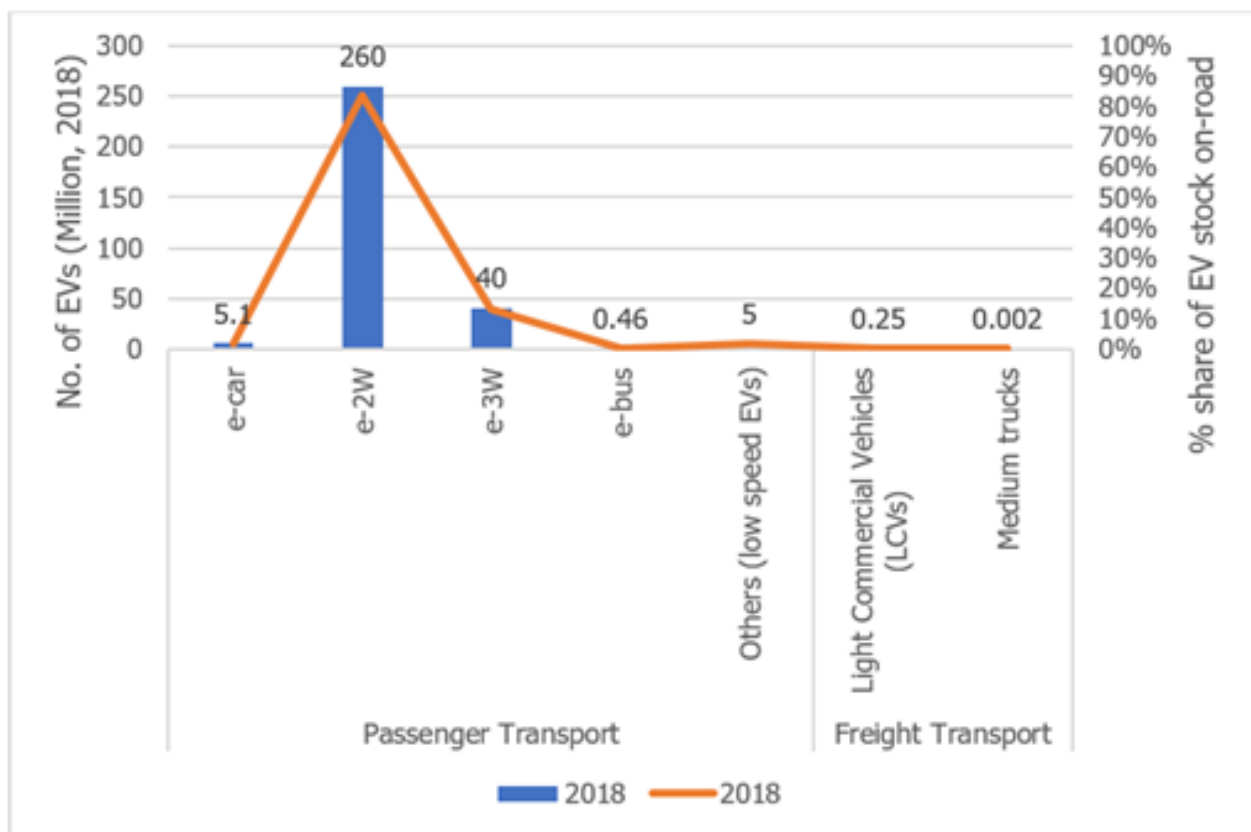


Figure 2. Global total EVs stock across vehicle segments

Electric Vehicles (EVs, pure electric, plug-in-hybrid) have emerged as a good alternative to Internal Combustion Engines ICEs and there are rising deployments since last few years. In 2018, there was nearly 310 million EV stock on-road (including 2Ws, 3Ws, cars, buses and trucks), of which e-2W formed ~84%, e-3W 13% and e-cars 1.6%. Various countries like United States of America (USA), European Union (EU), China, India, Canada, Japan, and others have built targeted EV Mission Programs and driving increased EV adoption through policy, supply fiscal incentives, demand subsidies, standardisation, Govt. procurement, encouraging private investments and many other interventions.

IEA's New Policies Scenario[9] estimates global EV sales to reach 23 million by 2030 (excluding 2W and 3W), emitting roughly 230 MtCO_{2e}, but would be almost double, i.e. 450 MtCO_{2e} if the equivalent vehicle fleet were powered by ICE powertrains. In comparison, the EV30@30

Scenario[10]¹⁰, launched at the Eighth Clean Energy Ministerial (CEM) in 2017, estimates EV sales to reach to 43 million by 2030 (excluding 2W and 3W) emitting around 230 MtCO_{2e}, while an equivalent ICE vehicle fleet would emit about 770 MtCO_{2e}[11]¹¹.

Transport demand per capita in developing and emerging economies is far lower than in Organization for Economic Co-operation and Development (OECD) countries but is expected to increase at a much faster rate in the next decades due to rising incomes and development of infrastructure.

National Scenario

The Government of India (GoI) is strongly committed to addressing its greenhouse gas (GHG) emissions. India is a signatory to the United Nations Framework Convention on Climate Change and has recently ratified the Paris Agreement. India submitted its Intended Nationally Determined Contribution (INDC) towards the Paris Agreement and agreed to reduce its GHG intensity by 33-35% by 2030, using 2005 levels as baseline.

The Government has also undertaken a National Clean Air Programme (NCAP) as a national level medium-term strategy to tackle the increasing air pollution problem across the country in a comprehensive manner. A program under the Ministry of Environment, Forest and Climate Change (MOEFCC), the overall objective of the program is to augment and evolve effective ambient air quality monitoring network across India while also ensuring a comprehensive management plan for prevention, control and abatement of air pollution. Implementation is prioritized in polluted cities called 'non-attainment cities' where particulate matter (PM₁₀ and PM_{2.5}) has been found to exceed permissible levels. e-Mobility is one of the important interventions for air pollution mitigation under National Clean Air Plan (NCAP).

The Government of India launched the National Electric Mobility Mission Plan (NEMMP) 2020 which envisaged introduction of about 6-7 million electric/hybrid vehicles in India by the year 2020. However, it has not seen the success rate as expected. Some of the key reasons for the slow growth are 'demand-supply gap?', 'unavailability of electric charging infrastructure?', 'upfront cost?' and 'limited supply-side?'. Also, there is no clear role defined by each Ministry, leading to overlapping roles and responsibilities resulting in delays in making decisions with certainty. The policy discussion and action on EVs have evolved in India with FAME-II scheme and now recently with Bharat Stage (BS) VI mandate. However, there is no comprehensive policy. Currently, there is no strategy to legislate the decree of 100% transition to electric mobility or achieve vehicle segment-wise electrification including buses, taxis, aggregators, and delivery vehicles within a stated timeline. Also, the policies focus more on technology, infrastructure, finance and affordability and has limited focus on end-users especially women.

Below table indicates India's electric vehicle deployments in comparison to China as of July 2019[12]¹². It indicates that despite the Government's focus on e-mobility, the progress is quite slow.

Table 1 ? India EV Deployment vs China

Vehicle Segment	India (Approx. # in million units)	China (Approx. # in million units)
e-2W	0.6	250
e-3W[13] ¹³	2.38	50
e-4W	0.007	1.35
TOTAL	2.987	301.35

Barriers:

Institutional Structure: India does not have a single line Ministry responsible for driving e-Mobility Vision/ Roadmap in the country. There is no common Strategy or Coordinating Agency announced with a clear road map, targets, monitoring and enforcement procedure. Earlier in 2017, the Government had set an ambitious goal of 100% new EV sales from 2030, which was then later revised to 30%. Govt. has appointed NITI Aayog to chair an Inter-Ministerial Committee for transformative Mobility, but this structure lacks enough resourcing and institutional authority. Different Ministries including MORTH, DHI, MOP, MOHUA, and MST are involved in different policies, standards, and regulations design, but their effective integration and ground execution at States and City level is still to come. Different states are coming up with individual EV State policies without any model road map to follow, and hence not well resourced to support effective implementation at City level. The current structure fails to drive coordinated planning and implementation at different levels of governments (Central, States and Cities) to ensure all actors and stakeholders work towards a common goal.

Integrated EV policy guidelines and effective implementation: India now has a good set of EV related policies, but these are fragmented between different line Ministries and States and lack effective integration and implementation. There is lack of comprehensive guideline or a framework that integrate different EV related policies, set aligned goals at National, State and City levels, define clear implementation agency, processes and monitoring framework, and clear governance structure to report issues and drive timely improvements. In lack of such comprehensive guidelines and dedicated EV Mission document, the top-to-bottom and bottom-to-top gaps in policies design, their integration and consistency with other policies and effective implementation are not identified and resolved, leading to sub-optimal EV ecosystem.

Affordability of EVs: India is a very price-sensitive market and EVs are at least 1.5 to 2 times^[14]¹⁴ costlier than equivalent ICEs. This higher up-front cost becomes a significant barrier even though the operating cost of an EV is 25% or lower compared to ICE. It would require at least 50% reduction in battery cost to achieve price parity of EVs with ICEs. Bringing the prices down rapidly and making it competitive with ICEs would require several measures including reducing the cost of production and developing efficient local supply ecosystem plus rapid scale-up of demand to capture the economy of scales. Initial Govt. capital subsidies for EVs have created a small momentum and significant interest in the private sector, but the resources allocated are relatively small compared to the size of the market to make EV ecosystem sustainable. With competing needs for resources, the government lacks the capacity to provide large scale support for enabling better affordability.

Financing for EVs: India is an evolved market for auto financing with greater than 75% penetration in passenger and commercial applications. But this is not the case with EVs because of perceived technology risks by Financial Institutions (FIs). Thus there is lack of financing in terms of comparable loan products (interest rate, moratorium, period, collateral etc.), enough players (a good mix of national and private banks), and easy accessibility for both the retail EV buyers and also commercial Fleet business operators. One primary reason for the apprehension of Financial Institutions is high (25-60%) value of EVs locked in the Lithium-Ion Batteries and its technology, range performance, battery life, reuse value, and recycle/ scrap value are still uncertain and not well established. This uncertainty in the residual value of EVs has led to a lack of attractive and innovative financing/ lending mechanisms being developed for both individual buyers and business fleet applications. This includes financing for battery leasing, rental, and swapping models as well, which can reduce the high upfront purchase price of EVs and convert into affordable OpEx cost.

Charging Infrastructure: Access to EV charging infrastructure is one of the key requirements to ensure faster adoption of EVs. It is estimated that there are some 500 public charging stations across India, and another 2,636 to be established in next one-year. India's EV charging infrastructure is still in its infancy at present and is yet to catch up to meet the country's requirements, hampering mass EV adoption. Charging infrastructure providers are experiencing challenges in setting public charging and battery swapping infrastructure due to limited public land availability (or low cost leased lands), long timelines and high cost for power connections, lack of clarity on enforcement of State announced special EV electricity tariffs, and lack of clear and long term established EV charging standards. The missing critical mass of EV users pose a challenge on attractive return on investments in setting public charging infrastructure, more so when initial capital expenditure is high. There is not much work done to facilitate and incentivize slow AC charging at home, workplaces, and existing parking hot spots in the cities. The innovative battery swapping and bulk charging models, which reduces acquisition cost of EVs are not recognized and incentivized by the various policies adopted. Cities that are acting as deployment centre for EVs and are hosting many pilots are not having long term plans for setting up city-wide EV charging infrastructure by user categories. Cities are unable to attract and facilitate private investments in EV commercial fleets, one of the most attractive and viable EV segments, due to lack of parking space and required charging infrastructure. High and certain volumes of commercial EV fleets by providing certainty and a significant share of the load for public charging infrastructure, improve the utilization and viability of charging infrastructure. Also, the key local stakeholders including Distribution Companies (DISCOM) and Urban Local Bodies (ULB) are not well coordinated and lack planning and execution capacity in supporting supply connections to the charging infrastructure.

Secondary market for Lithium-Ion Batteries (LIBs): A significant share (40-60%) of residual value of EVs is locked in LIBs. Some key challenges in tapping this residual value include no clear established technology/ process/ facility, limited players for re-use and recycling of LIBs from EVs in India and no policy framework to guide the market development. A recent draft policy from MoEFCC has mandated safe disposal of LIBs through Extended Producer Responsibility (EPR), which is a good direction. This lack of Lithium-Ion Battery reuse and recycle facility is leading to undiscovered residual value in EVs, and not allowing buildup of required financing instruments for EV growth in passenger and commercial fleet applications, including loans, equity, performance guarantees, securities, and insurance. The secondary market for LIBs is expected to emerge in next 5 years with opportunities to use them as stationery batteries in various sectors. Overcoming the above-mentioned barriers would allow to tap the secondary market for LIBs.

EV models availability: EV manufacturers are growing in the Indian market across all categories (e-2W, e-3W, e-cars, e-Buses), but still the choice of models is limited. The models available do not match targeted end-user expectations in terms of range, speed, acceleration, charging time, comfort, features, price, and robustness compared to ICEV options. The limited available e-car models from Indian Original Equipment Manufacturers (OEMs), e.g. Mahindra and Tata Motors have not been able to attract premium users, which are usually the first movers, in the fleet segment, an attractive market for EVs. Similarly, the available models in e-2W and e-3W do not deliver expected range, efficiencies and robustness required for fleet applications. There is the challenge that investors, in the absence of visible demand, are not innovating to meet consumer needs. There is also a lack of information on consumer perceptions and needs that could help the OEMs develop appropriate models for the market. More choices in EVs with matching or better performance compared to ICEs and price affordability with the right financing would allow better uptake in fleet and individual use segments.

Information and awareness among consumers: Though the government has been taking actions to promote the use of EVs through various fiscal and non-fiscal incentives, there has been little effort at creating mass awareness among the users and creating a strong narrative on the proposed shift. Average daily travel distances are less in Indian cities, but people continue facing range anxiety and prefer high range EVs, which are costlier and less affordable. There is little awareness of multiple EV charging options, including home and workplace charging and innovations like battery swapping. This leads to the perception of lesser availability of public EV charging infrastructure and further adds to the range anxiety. OEMs supported lower speed EV models and first variants in the market add to the wrong perception that EVs cannot provide a driving experience comparable to ICEs. These issues coupled with low visibility of EVs on-road and the absence of opportunities for test rides further adds to the lack of awareness among consumers.

Credible and updated Information on EV deployments: There is no effective system or portal to monitor, gather, analyze, and disseminate information on EVs deployment by different agencies. Consequently, lessons are often not well communicated and there is a lack of information on best practices. There is a low level of awareness among planners and decision-makers on the linkages and potential common interventions to address climate change from the transport sector. There is no system to monitor GHG emissions at the city level to form a useful baseline and monitor different interventions including e-Mobility to curb city pollution. Lack of information and its aggregation with one central agency (and in one portal) limits coordination and effective partnering between different sectoral stakeholders for driving improved EV adoption.

2) Baseline scenario and any associated baseline projects

India BAU (Business as Usual) Transport Sector

The total registered vehicles in India have grown from 89,618,267 (~89 millions) in 2006 to 230,030,598 (~230 millions) in 2016, a 257% increase. Most of the vehicles registered in 2016 were motorcycles (73%) followed by cars (15%), three-wheelers (3%)^[15]. Maharashtra has a share of 12% of the total registered vehicles in India. followed by Tamil Nadu (11%), Uttar Pradesh (10%) and Gujarat (9%).

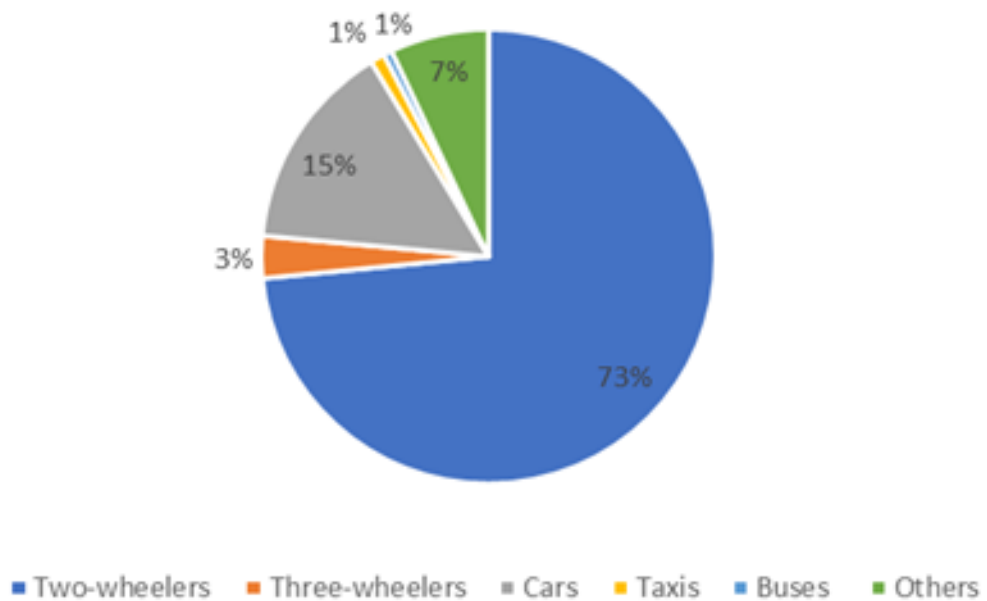


Figure 3: Transport Mix in 2016

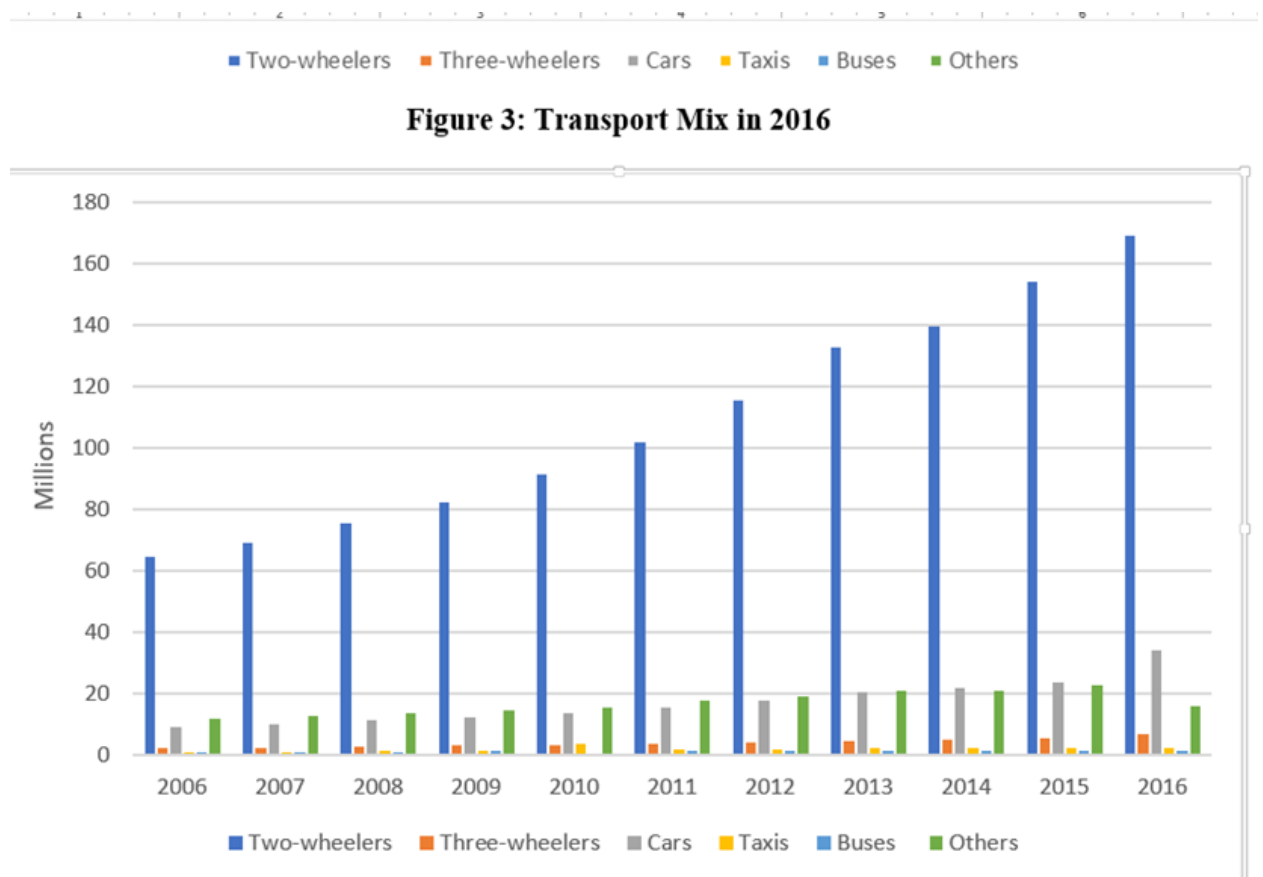


Figure 4: YEAR-WISE VEHICLE GROWTH

Motorcycles, three-wheelers, cars, buses have increased by 238%, 234%, 261%, 200% respectively from 2006 to 2015. Currently, the EV market in India is at a nascent stage with a total stock of 2.9 million vehicles. Electric two-wheeler and three-wheeler contribute 21% and 78% respectively of the total stock. The number of electric vehicles has increased significantly in the last 3 years. 54,800 e-2Wheeler, 850,000 e-3Wheeler (mostly lead-acid battery driven low speed vehicles) and 1,200 e-cars were sold in 2018. [16]¹⁶ E-Buses are being deployed in India through combination of subsidies from Government of India under FAME I/ II and respective State Government. Hence, it is not considered in this GEF project, given the funding limitations. Support to e-buses is also being considered under a proposed World Bank project which is referenced in a later section.

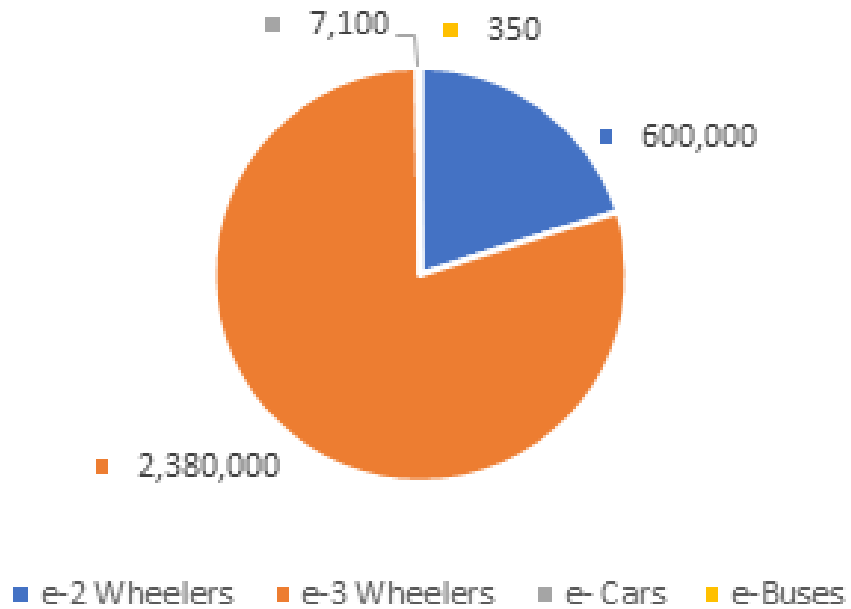


Figure 5 - Number of Electric Vehicles in India in 2019

Passenger vehicle population in 9 biggest cities in India constitute 17.5% of total passenger vehicles in the country. The transport sector contributes about 12% of total pollution load in cities. The 2W and 3W population contributes ~38% of total GHG emission from passenger transport.

The EV manufacturing in India has picked up well, with many start-ups newly entering and established OEMs, PSUs, Corporates deepening their portfolio. Following is the list of key companies involved in EV manufacturing in India:

e-2W	e-3W	e-4W	e-Bus
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e-2W	e-3W	e-4W	e-Bus
? ACE	? Bajaj Auto	? Mahindra Electric	? Goldstone-BYD
? Ajanta Manufacturing Ltd.	? Gayatri Electric Vehicles	? Tata Motors	? Tata Motors
? Ather Energy	? Goenka Electric Vehicles Pvt. Ltd	? Hyundai Motor India	? Ashok Leyland
? Avon Cycles	? Pi Beam Labs	? Toyota India	? Eicher Motors
? BPG Motors	? Pubang Etron Electric Motor Private Limited	? Volvo Cars India	? Foton PMI
? BSA Motors	? Scooters India Ltd.	? MG Motors	? JBM Solaris
? Chris Motors	? Shigan EV (GreenRick)		? Force Motors
? Eko	? Volta Automotive India Pvt. Ltd.		
? Electrotherm	? Hero Electric		
? Electrowheelz	? Mahindra Electric		
? Evolet	? Lohiya Auto		
? GoGreen BOV	? Kinetic Green		
? Hero Motor Corp	? Mayuri		
? Honda Motorcycle & Scooter India (HMSI)			
? Hulikkal Electro India			
? Menza Motors			
? Milltex Spero			
? Okinawa Autotech Pvt. Ltd.			
? Peugeot			
? Revolt Motors			
? Tork Motorcycles			
? Tunwal E-vehicles			
? TVS Motors			
? Twenty Two Motors			
? Ultra Motors			
? UM Lohia Two Wheelers Pvt. Ltd.			
? Volta Motors			
? Yo Bykes			

Table 2 ? EV Manufacturers in India

The overall supply chain is also building up though slowly. Some key component manufacturers in EV value chain in India are:

Motors	Chargers	Battery
? BHEL	? ABB	? Mahindra and Mahindra
? Borg Warner	? Mass-Tech	? Suzuki
? Hitachi	? Exicom	? Exicom
? Hindustan Electric Motors	? BHEL	? Reliance
? Bosch Group of companies	? Delta	? Exide
? Greaves Cotton Limited	? Schneider	? ACME Cleantech solutions
? SEG Automotive India Private Limited	? Siemens	? Grinntech
	? Okaya	? Panasonic
	? EVQpoint	? Samsung SDI
	? Ensto	? LG Chem
	? EVI Technologies	? Tata Chemicals Ltd
	? VIN Semiconductor	? BASF Catalysts India Pvt. Limited
	? Imperial Engineering	? Okaya Power
	? RRT Electro Power	? Livguard Energy
	? Analogies Tech India	

Table 3 ? EV Component manufacturers In India

Below are some fleet operators in India that have started deploying EVs:

e-2W	e-3W	e-4W	e-Bus

?	Yulu	?	ETO	?	Ola	?	Prasanna Purple Mobility Solutions
?	Bounce	?	SmartE	?	Blusmart	?	MSRTC
?	Blive	?	Ola	?	Lithium Technologies	?	Shuttl
?	Bounce	?	Amazon	?	Pune Cabs		
?	Driveezy	?	SmartE	?	Glyd (Mahindra-Meru)		
?	Yulu	?	Zbee	?	Routomatic		
?	Vogo	?	Mauto Electric Mobility				
?	Rapido						
?	Fae Bikes						
?	QuickRides						
?	Wheelstreet						
?	Mobycey						
?	Ridebird						
?	Delhivery						
?	Buymyev						
?	ROLR						
?	Baxi						
?	ebikego						
?	rentongo						

Table 4 ? EV Fleet Operators in India

Energy landscape

India is the world's third-largest producer and third-largest consumer of electricity. The total installed capacity in India is 364,958 MW. The gross electricity consumption in 2018-19 was 1,181 kWh per capita. India's electricity consumption per capita is among the world's lowest. Electricity generation from conventional sources during 2018-19 was 1249.337 Billion Units (BU) as compared to 1206.306 BU generated during 2017-18, representing a growth of about 3.57%.

India had an installed renewable energy capacity of ~128 GW at the end of Sep 2019. Breakup of renewable energy across different sources and their percentage distribution is shown in below table. As

per Central Electricity Authority (CEA), the share of renewable energy in the country's overall power generation rose from 5.6% in 2014-15 to 9.2% in 2018-19. Government of India has set a target of installing 175 GW of renewable energy capacity by 2022 including 100 GW from solar, 60 GW from wind, 10 GW from biomass and 5 GW from small hydropower projects. The Government in its policy statement to the Parliament, in January 2020, also announced a target of 450 GW of renewable energy by 2030.

At present, ~31 GW capacity projects are at various stages of implementation and ~18 GW capacity projects are under various stages of bidding. The overall expected capacity addition in the sector is likely to stand between 8.5 GW and 9.0 GW in the current financial year (i.e. upto March 2020).

Type	MW	% of Total
Total Thermal	2,29,401	62.86%
Coal	1,97,694	54.17%
Lignite	6,260	1.72%
Gas	24,937	6.83%
Diesel	510	0.14%
Hydro (Renewable)	45,399	12.44%
Nuclear	6,780	1.86%
Renewable	83,378	22.85%
Small Hydro Power	4,647	1.27%
Wind Power	37,090	10.16%
Bio-Power	9,945	2.72%
BM Power/Cogen.	9,806	2.69%
Waste to Energy	139	0.04%
Solar Power	31,696	8.68%
Total	3,64,958	100.00%

Table 5 ? Total Installed Capacity (As on 30.09.2019)[17]¹⁷

Thermal power plants form approx. 63% of the total electricity generation in India as of September 2019. The grid emission factor for India is 0.82 tCO₂/MWh.[18]¹⁸

In 2014, a total estimated GHG emission from India is 3,202 MtCO₂e, 6.55% of total world emissions. The energy sector accounts for 68.7% of the total emissions in India; agriculture sector 19.6%; and industrial processes 6%. India emits 2.48 tCO₂e per capita, much lower to the world average of 6.73 tCO₂e per capita.[19]¹⁹

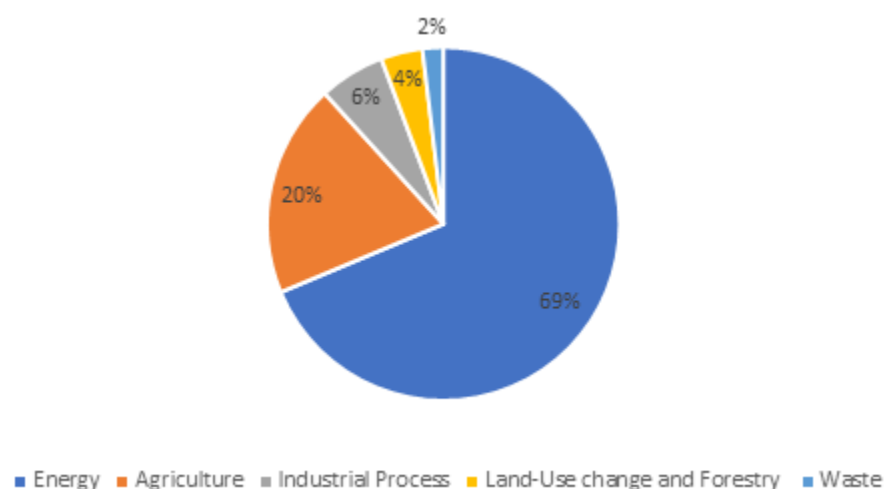


Figure 6 - GHG emissions by sectors in 2014

Within the energy sector, 49% of emissions were due to electricity and heat generation, 24% from manufacturing and construction and 11% from the transport sector. Under transport sector GHG inventory, road transport alone accounted for 87% of the GHG emissions.

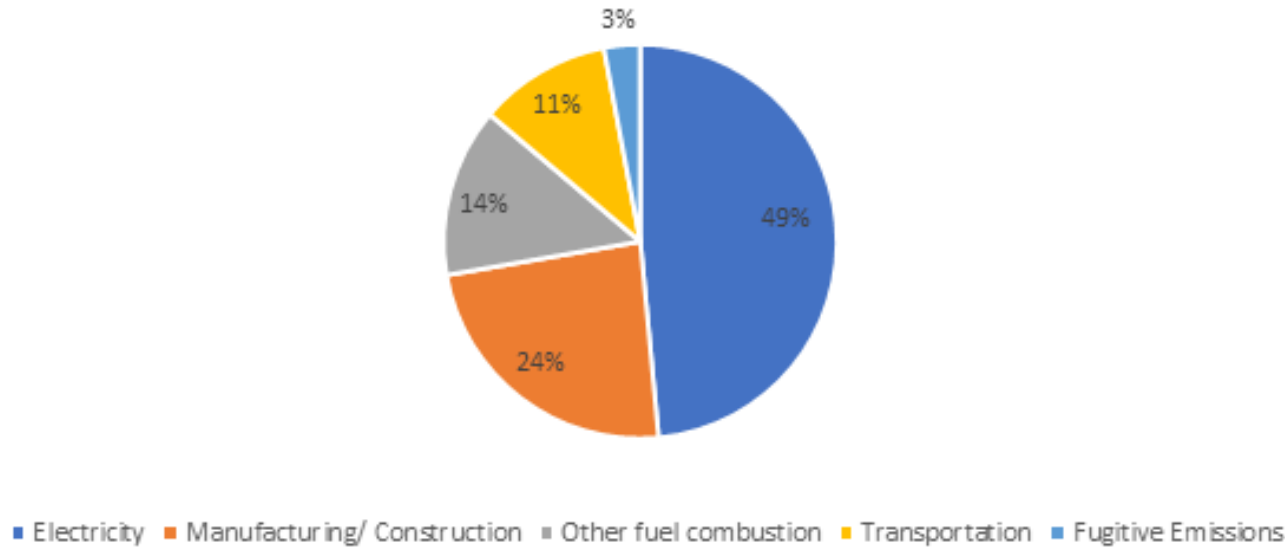


Figure 7 ? GHG emissions breakup in Energy sector in 2014

Given the size and diversity of the country, achieving significant EV progress in India is not an easy journey. The diversity at city level is huge, and this provides both challenges and opportunities. It was industry participation and city level entrepreneurship traction that resulted into early pilots in e-Mobility in India, despite Central Government delays in announcement of dedicated National e-Mobility Mission. While Government has an important role in setting targets and it shall flow top-down, cities shall act as zero ground for all EVs deployment. And industry and local stakeholders at city level will play an important role to strengthen the overall ecosystem, supply chain and experience of the end-users to drive big wave of e-Mobility in India. It will be these market forces that will sustain e-Mobility development and its scale-up in India.

The city level intelligence around EV deployment from local stakeholders brings numerous insights on key aspects like 1) product development 2) production supply chain 3) charging infrastructure and services 4) financing 5) institutional structure for policies execution, etc. Such regular city intelligence can be used and put into next improvement and expansion plans. Cities should start looking at e-Mobility not in isolation but as means to build smart, sustainable and friendly cities.

Policy Overview

The Government has taken multiple policy initiatives, such as the National Electric Mobility Mission Plan 2013^[20], which sets out first goal, and FAME 2015^[21] to provide incentives and investments

to scale-up infrastructure (manufacturing and charging infrastructure) to promote the use of e-vehicles. FAME I has subsidized 182,675 EVs to date^[22], mostly 2 and 3 wheelers, and is also focused on public transport (Buses and 3 wheelers).

Complementary to FAME, EESL^[23] is implementing a program to stimulate demand and production of e-cars and related charging infrastructure. EESL is in the process of procuring 20,000 cars and 4,000 chargers for government use. Tender for chargers and the first lot of 10,000 e-vehicles was launched in 2017^[24]. Under the project, it has deployed 1564 e-cars across 19 states in India. EESL is in process of procuring 489 more vehicles for the fleet operators and is also focusing on deploying charging stations across the country. It has planned to deploy 511 AC chargers and 231 DC chargers. Further procurement shall be done on the basis of the deployment of vehicles to fleet operators. EESL through its innovation challenge, #InnovateToINSPIRE 2019, invited entrepreneurs, innovators, and the start-up community to provide viable solution to address specific issues like Innovation in the domain of E-Mobility.

India specific charging standards for AC (AC-001) and DC (DC-001) charging was announced by the Department of Heavy Industries (DHI)^[25]. Department of Science and Technology (DST) is revisiting the standards to enable universality. The Ministry of Power has taken the lead in development of charging infrastructure and has appointed Bureau of Energy Efficiency (BEE) as Central Nodal agency for charging infrastructure. Niti Aayog released a whitepaper on the topic *“ZEVs: Towards a Policy Framework”* at the MOVE Summit 2018. The paper outlines and discusses the key elements of a generic EV policy framework.

Timeline	Policies / Regulations / Standards/	Department	Key points related to low carbon emissions in Transportation and EVs
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2010	Alternative Fuel for surface Transportation Program	Ministry of New and Renewable Energy	<div>(iii) Alternative Fuel for surface Transportation Programme provided physical targets and financial assistance for Battery operated vehicles in India.</div> <table><tr><th>Sr. No</th><th>Vehicle Segment</th><th>Maximum applicable incentives</th></tr><tr><td>1</td><td>e-2Wheeler</td><td>71.4 USD (Rs. 0.05 lakh)[26]²⁶ or 20 % ex-works cost of vehicles whichever is less</td></tr><tr><td>2</td><td>e-3Wheeler</td><td>857 USD (Rs. 0.6 lakh) or 20 % ex-works cost of vehicles whichever is less</td></tr><tr><td>3</td><td>e-4Wheeler</td><td>1428.5 USD (Rs. 1 lakh) or 20 % ex-works cost of vehicles whichever is less</td></tr><tr><td>4</td><td>e-Bus</td><td>5714.2 USD (Rs. 4 lakhs) or 20 % ex-works cost of vehicles whichever is less</td></tr></table> <div>(iv)</div>	Sr. No	Vehicle Segment	Maximum applicable incentives	1	e-2Wheeler	71.4 USD (Rs. 0.05 lakh)[26] ²⁶ or 20 % ex-works cost of vehicles whichever is less	2	e-3Wheeler	857 USD (Rs. 0.6 lakh) or 20 % ex-works cost of vehicles whichever is less	3	e-4Wheeler	1428.5 USD (Rs. 1 lakh) or 20 % ex-works cost of vehicles whichever is less	4	e-Bus	5714.2 USD (Rs. 4 lakhs) or 20 % ex-works cost of vehicles whichever is less
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4	e-Bus	5714.2 USD (Rs. 4 lakhs) or 20 % ex-works cost of vehicles whichever is less																
2011	National Mission for Electric Mobility	Department for Heavy Industries (DHI)	<div>(v) Aimed to provide Government support on all matters related to EV and create synergistic methods for long-term commitment and ownership among the stakeholders involved in the programme.</div>															

2013	National Electric Mobility Mission Plan (NEMMP)	Department for Heavy Industries (DHI)	<p>(vi) NEMMP aimed at developing indigenous electric mobility manufacturing base by creating initial boost to create demand for EVs through three key factors:</p> <ul style="list-style-type: none"> o Demand incentives o In-house technology development o Domestic adoption <p>(vii) It is estimated that investment up to 2.1 billion USD (Rs. 14,000 crores)[27]²⁷ would be required in creating infrastructure and promoting the use of environment-friendly electric vehicles</p> <p>(viii) It estimates the sale of 6-7 million EVs by 2020 and a resultant fossil fuel saving of 2.2-2.25 Million Tonnes.</p>
2015	Motor Vehicle Rule	Ministry of Road Transport and Highways, Government of India	<p>(ix) Amendment to the motor vehicle rules to promote electric rickshaws in the country</p> <p>(x) This amendment categorized battery-powered e-rickshaws as a valid form of commercial transport in India</p>

2015

Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles I (FAME I)

Department for Heavy Industries (DHI),

Government of India

(xi) The main objective of FAME is to encourage electric vehicles by providing subsidies. It focuses on four areas, namely technology development, demand generation, pilot projects and building infrastructure.

(xii) The scheme aims to boost electric mobility and increase the number of electric vehicles in commercial fleets.

(xiii) FAME I had a budget of 113.57 Million USD (Rs. 795 crores) to incentivize EVs in India.

Sr. No	Vehicle Segment	Maximum applicable incentives
1	e-2Wheeler	414.2 USD (Rs. 0.29 lakh)
2	e-3Wheeler	871.4 USD (Rs. 0.61 lakh)
3	e-4Wheeler	1,971 USD (Rs. 1.38 lakh)
4	4-Wheeler Strong Hybrid	2,671 USD (Rs. 1.87 lakh)
5	e-Bus	94,285.7 USD (Rs. 66 lakhs)

(xiv) As a part of FAME-I, 11 cities were given subsidy of 62.4 Million USD (INR 437 crores) for launching e-buses, taxis and three-wheelers in their respective regions.

(xv) The government has sanctioned a total of 390 buses, 370 taxis and 720 three wheelers.

(xvi) 390 Buses worth 0.12 Million USD ? 0.14 Million USD (Rs. 85 lakh ? Rs. 1 crore (about 60% of cost) : The nine big cities (Delhi, Ahmedabad, Bengaluru, Jaipur, Mumbai, Lucknow, Hyderabad, Indore and Kolkata) will be given subsidy for 40 buses each, while Jammu and Guwahati will get subsidy for 15 buses each

(xvii) 370 Taxis worth 1428.5 USD ? 1771.4 USD (INR 1 lakh-1.24 lakh (about 10% -15% of cost)): Kolkata will get subsidy for 200 e-taxis, followed by Bangalore for 100 e-taxis, Indore for 50 e-taxis and Ahmedabad for 20 e-taxis

(xviii) 720 3W worth 528 USD ? 871 USD (INR 37,000-INR 61,000) (about 20% of cost): Bangalore will get subsidy for 500 three-wheelers, followed by Indore for 200 three-wheelers and Ahmedabad for 20 three-wheelers

(xix) Progress Update: Successful in increasing the share of hybrid and EV from 0% to 0.9% in the FY

2016	E-Waste (Management) Rule	Ministry of Environment, Forest and Climate Change, Government of India	March 2016 <p>? This rule ensures recovery and/or reuse of useful material from e-waste, thereby reducing the hazardous wastes destined for disposal by the concept of Extended Producer Responsibility (EPR)</p> <p>? It is an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle.</p> <p>? Producer takes the responsibility for collection and channelization of e-waste generated from their products to ensure environmentally sound management.</p>
2017	Electric Vehicle Conductive AC Charging System	Ministry of Road Transport and Highways, Government of India	Feb 2017 <p>? This standard prescribes the specifications for performance and safety for AC charging stations for EV and HEV applications in India.</p> <p>? It was derived from the following regulations:</p> <p>Electric vehicle conductive charging system - Part 1: General Requirements</p> <p>Electric vehicle requirements for conductive connection to an AC /DC supply</p> <p>Requirements for AC electric vehicle charging stations for conductive connection.</p> <p>? This standard applies to charging electric road vehicles at standard AC supply voltages (as per IS 12360/IEC 60038) up to 1000 V and for providing electrical power for any additional services on the vehicle if required when connected to the supply network.</p>

2017	E-Waste (Management) Rule	Ministry of Environment, Forest and Climate Change, Government of India	<p>October 2017</p> <ul style="list-style-type: none"> ? Amendment was made to the E-Waste (Management) Rule. The targets were revised, and it will be monitored under the Central Pollution Control Board ? Revised targets of e-waste collection, 10% of the quantity of waste generated shall be collected during 2017-2018. Further, there shall be a 10% increase every year until the year 2023. After 2023, the E-Waste collection target has been fixed at 70% of the quantity of waste generation.
2018	Clarification on charging infrastructure for electric vehicles	Ministry of Power & Renewable Energy, Government of India	<p>April 2018</p> <ul style="list-style-type: none"> ? Clarification to de-license sale of electricity for EV charging ? Before the clarification, the regulatory structure allowed only three business models for setting up charging infrastructure monitored by State Electricity Regulatory Commission: <ul style="list-style-type: none"> Distribution Licence owned EV charging Infrastructure Distribution Licence franchised EV charging Infrastructure Privately-owned battery swapping stations ? Setting up charging stations for electric vehicles does not need a separate license under the Electricity Act of 2003. ? EV charging will be considered a service and not a resale of electricity.
2018	Central Motor Vehicles Rules	Ministry of Road Transport and Highways, Government of India	<p>August 2018</p> <ul style="list-style-type: none"> ? Amendment to Central Motor Vehicles Rules for electric vehicle number plate ? The registration mark shall be exhibited in Yellow colour on Green background for transport vehicles and for all other cases, in White colour on Green background

2018	National Energy Storage Mission	Ministry of Power & Renewable Energy, Government of India	<p>August 2018</p> <ul style="list-style-type: none"> ? NITI Aayog and Rocky Mountain Institute's joint report on India's Energy Storage Mission has proposed three stage solution approach i.e. creating an environment for battery manufacturing growth; scaling supply chain strategies; and scaling of battery cell manufacturing ? Energy Storage is one of the most crucial & critical components of India's energy infrastructure strategy and for supporting India's sustained thrust to renewables ? Key areas for energy storage application include: <ul style="list-style-type: none"> Integrating renewable energy with distribution and transmission grids Setting rural micro grids with diversified loads or stand-alone systems Developing storage component of electric mobility plans
2018	Motor Vehicles Act, 1988	Ministry of Road Transport and Highways, Government of India	<p>October 2018</p> <ul style="list-style-type: none"> ? Amendment to Central Motor Vehicles Rules, 1988 to allow driving licenses to be given for age group 16-18 years to drive gearless electric scooters and bikes up -

2018	Guidelines and Specifications for Charging Infrastructure	Ministry of Power & Renewable Energy, Government of India	<p>Dec 2018</p> <p>? These are guidelines and standards for charging infrastructure for electric vehicles in India.</p> <p>? The key objectives are to enable faster adoption of electric vehicles, promote affordable tariff, to build city-wide charging infrastructure, to create a market for electric vehicle charging business, and to encourage preparedness of Electrical Distribution System.</p> <p>? New guidelines to ensure that at least one charging station should be available in a grid of 3 km x 3 km in the cities</p> <p>? One charging station every 25 km on both sides of highways. Fast charging station at every 100 km</p> <table><tr><th>Charge r Type</th><th>Charger connectors*</th><th>Rated Voltage</th></tr><tr><td rowspan="3">Fast</td><td>CCS (min 50 kW)</td><td>200-1000</td></tr><tr><td>CHAdemo (min 50 kW)</td><td>200-1000</td></tr><tr><td>Type-2 AC (min 22 kW)</td><td>380-480</td></tr><tr><td rowspan="2">Slow</td><td>Bharat DC-001 (15 kW)</td><td>72-200</td></tr><tr><td>Bharat AC-001 (10 kW)</td><td>230</td></tr><tr><td colspan="3">*Other chargers as per approved BIS standards whenever notified</td></tr></table>	Charge r Type	Charger connectors*	Rated Voltage	Fast	CCS (min 50 kW)	200-1000	CHAdemo (min 50 kW)	200-1000	Type-2 AC (min 22 kW)	380-480	Slow	Bharat DC-001 (15 kW)	72-200	Bharat AC-001 (10 kW)	230	*Other chargers as per approved BIS standards whenever notified		
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*Other chargers as per approved BIS standards whenever notified																					
2019	Electric Mobility Policy Framework	Ministry of Housing and Urban Affairs Government of India	<p>? Enables city managers to introduce or improve uptake EVs in respective their cities.</p> <p>? The framework provides information on the electric mobility landscape in India with a focus on relevant policies and schemes.</p>																		

2019	Model Building Byelaws (MBBL) 2016 and Urban Regional Development Plans Formulation and Implementation (URDPFI) Guidelines	Ministry of Housing and Urban Affairs Government of India	February 2019 <ul style="list-style-type: none"> ? Amendments were made to Model Building Byelaws (MBBL) 2016 and Urban Regional Development Plans Formulation and Implementation (URDPFI) Guidelines making provisions for establishing Electric Vehicle Charging Infrastructure ? 20% of all vehicle holding capacity/parking capacity at the premise should be allocated for Electric vehicles. ? Metering and payments of bills to be linked with the house owner's monthly maintenance bills ? Building to provide open metering and on the spot payment options for visitors
2019	National Mission on Transformative Mobility and Battery Storage	NITI Aayog	March 2019 <ul style="list-style-type: none"> ? Mission aimed to promote indigenization of electric mobility and batteries. ? Propose and recommend policy guidelines and government interventions and possible strategies for holistic, sustainable and transformative mobility and energy storage in India ? Analyse and propose the key interventions, incentives and projects required. Also, prioritise and recommend the same to the nodal agency for its implementation. Additionally, plan the short-term and long-term road map for these interventions. ? Phased Manufacturing Programmes to be launched for EVs and EV Components. Phased Manufacturing Programme (PMP) valid for 5 years till 2024 to support setting up of a few large-scale, export-competitive integrated batteries and cell-manufacturing Giga plants in India. ? Examine and propose to the council of Ministries/Cabinet the introduction of any legislation, act or notification or amendment to an existing legislation, act or notification upon the recommendation of the Steering Committee.

2019	Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles II (FAME II)	Department for Heavy Industries, Government of India	<p>March 2019</p> <p>(xx) The main objective of FAME is to encourage electric vehicles by providing subsidies. It focuses on four areas, namely technology development, demand generation, pilot projects fast-charging and building infrastructure.</p> <p>(xxi) It will offer incentives to manufacturers who invest in developing electric vehicles and its components, including lithium-ion batteries and electric motors.</p> <p>(xxii) The outlay of 1.43 billion USD (Rs. 10,000 crores) have been made for three years till 2022 for the FAME 2 scheme.</p> <p>(xxiii) FAME-II aimed to provide impetus to the adoption of electric and hybrid vehicles and establishing necessary charging infrastructure through the key components mentioned below</p> <p>(xxiv) Demand incentives (Upfront incentives on the purchase)- 1.23 billion USD (INR 8596 crores)</p> <p>(xxv) Charging infrastructure incentives ? 142.8 Million USD (INR 1000 crores)</p> <p>(xxvi) Administrative expenditure including publicity, ICE (Information, Communication and Education) activities</p> <p>(xxvii) Committed expenditure of 48 Million USD (INR 336 crores) of phase I</p> <p>(xxviii) Subsidy given to the following categories</p> <p>(xxix) Buses (only Electric Vehicle technology) ? 506. 4 Million USD (INR 3545 crores)</p> <p>(xxx) Four wheelers (EV, PHEV, SHEV) ? 78.7 Million USD (INR 551 crores) (Private 4W not included)</p> <p>(xxxi) Three-wheelers (Electric) including Registered E-Rikshaws ? 357.1 Million USD (INR 2500 crores)</p> <p>(xxxii) Two Wheelers (Electric) ? 285.7 Million USD (INR 2000 crores)</p> <p>(xxxiii) As the cost of batteries is one of the significant factors of difference in acquisition price of EVs and ICE vehicles, the demand incentives will be based on the battery capacity (i.e. energy content measured in KWh, 142.8 USD (INR 10K) per KWh for EVs and 285 USD (INR 20K) for e-buses)</p>
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2019	Union Budget 2019	Ministry of Finance, Government of India	<p>April 2019</p> <p>(xxxiv) In Union Budget 2019, announcements were made to boost electric vehicles sales</p> <p>(xxxv) Goods and Services Tax (GST) on electric vehicles reduced from 12% to 5%.</p> <p>(xxxvi) Additional income tax deduction of 2142.8 USD (Rs. 1.5 lakh) on the interest paid on loans taken to buy EVs.</p> <p>(xxxvii) GST on chargers for e-vehicles reduced to 12% from 18%</p>
2019	Motor Vehicle Rules	Ministry of Road Transport and Highways, Government of India	<p>June 2019</p> <p>(xxxviii) Amendment to the motor vehicle rules to increase the sales of the number of electric vehicles in the country</p> <p>(xxxix) MORTH has exempted electric vehicles from registration charges</p>

2019	Guidelines and Specifications for Charging Infrastructure	Ministry of Power & Renewable Energy, Government of India	<p>October 2019</p> <p>(xl) Amendment to the Guidelines and Specifications for Charging Infrastructure to increase the charging infrastructure in India.</p> <p>(xli) Bureau of Energy Efficiency (BEE) is the Central Nodal Agency for Public Charging Stations (PCS)</p> <p>(xlii) Public charging stations can avail State Electricity Regulatory Commission approved EV charging electricity tariff, through separate electricity meter</p> <p>(xliii) Intracity PCS can have any number and any approved type of chargers</p> <p>(xliv) No fixed requirements for any dedicated Distribution Transformer or heavy infrastructure</p> <p>(xlv) Location of PCS</p> <p>(xlvi) At least 1 Charging Station (CS) in grid of 3*3 km</p> <p>(xlvii) 1 CS at every 25 km on both sides of road on highways/roads</p> <p>(xlviii) Fast Charging Station (FCS) at every 100 km one on each side of the highways/road located preferably within/alongside the PCS notified. Within cities such stations shall be located within bus depots, Transport Nagars.</p> <p>(xlix) Oil marketing companies will be given preference to set CS.</p> <p>(l) Tariff framework</p> <p>(li) The tariff applicable for domestic charging of EVs shall be applicable under domestic consumption</p> <p>(lii) The separated metering arrangement will be made for PCS so that consumption can be recorded and billed as per applicable tariff for EV stations</p> <p>(liii) Roll-out plan for PCS</p> <p>(liv) Phase I (1-3 years): All mega cities (+4 million population)</p> <p>(lv) Phase II (3-5 years): State Capitals, Union Territories (UT)headquarters, important highway connected with each of the Mega Cities</p>
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2020	Battery Waste Management Rules, 2020	Ministry of Environment, Forest and Climate Change	<p>February 2020</p> <p>(lvi) This draft policy defined the roles and responsibilities of different stakeholders and procedure for seeking authorization and registration for handling battery wastes</p> <p>(lvii) The rules apply to every manufacturer, producer, collection center, importer, re-conditioner, re-furbisher, dismantler, assembler, dealer, recycler, auctioneer, vehicle service center, consumer and bulk consumer involved in manufacture, processing, sale, purchase, collection, storage, re-processing and use of batteries or components there of including their components, consumables and spare parts</p> <p>(lviii) Following target has been proposed in battery waste collection</p> <table><tr><th>#</th><th>(lix) Year</th><th>Battery-Waste Collection Target (Number/Weight)</th></tr><tr><td>(i)</td><td>During first two year of implementation of rules</td><td>30% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan</td></tr><tr><td>(ii)</td><td>During third and fourth years of implementation of rules</td><td>40% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan.</td></tr><tr><td>(iii)</td><td>During Fifth and Sixth years of implementation of rules</td><td>50% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan.</td></tr><tr><td>(iv)</td><td>Seventh year onward of implementation of rules</td><td>70% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan.</td></tr></table> <p>(lx) Central Pollution Control Board or State Pollution Control Board will permit a producer, for managing Extended Producer Responsibility (EPR-Authorization)</p>	#	(lix) Year	Battery-Waste Collection Target (Number/Weight)	(i)	During first two year of implementation of rules	30% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan	(ii)	During third and fourth years of implementation of rules	40% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan.	(iii)	During Fifth and Sixth years of implementation of rules	50% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan.	(iv)	Seventh year onward of implementation of rules	70% of the quantity of waste generation as indicated in Extended Producer Responsibility Plan.
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Table 6 ? National Level Policies/ Regulations/ Standards

State-level Policy Overview

11 State Governments (i.e. Kerala, Uttar Pradesh, Andhra Pradesh, Karnataka, Maharashtra, Delhi, Madhya Pradesh, Tamil Nadu, Telangana, Bihar and Uttarakhand) have come out with their respective policies to promote e-mobility or are in the process of finalizing a policy/scheme. Most of these policies are focused on creating manufacturing capacity (vehicles and battery), given the economic benefits that would accrue to the States. The policies also include fiscal measures to manufacture vehicles, develop charging infrastructure as well as lower the price of vehicles. However, the budgetary allocations so far are not at a scale to have a large impact. Some State Government (e.g. Delhi) have provided incentives to consumers directly via road tax exemption, subsidy on the purchase, etc. Most of these state EV policies are yet to be enacted and those published are yet to be strongly executed and monitored.

S. No	State	Timeline	Description
1.	Karnataka	2017	<p>(lxi) The Government of Karnataka intends to make Karnataka the EV capital of India and encourage 100% of three and four-wheelers moving goods to transition to electric by 2030.</p> <p>(lxii) Karnataka aims to attract investment of 4428.5 Million USD (INR 31,000 crores)</p> <p>(lxiii) The separate tariff has been introduced (4.85/kWh) for EVs</p> <p>(lxiv) STUs will procure 1000 e-Buses during a time period of 5 years</p> <p>(lxv) Incentives for first 100 fast chargers</p>
2.	Maharashtra	2018	<p>(lxvi) Target to increase the number of EV regulations in the State to 500,000.</p> <p>(lxvii) Incentives and provisions for EV buyers of private/public passenger vehicles that are registered in-state over the policy period of 5 years.</p> <p>(lxviii) Maharashtra aims to attract investments of 3571.4 Million USD (INR 25,000 crores) for the manufacturing of EVs.</p>

3.	Delhi	2018	<p>(lxix) Aims at 25% new vehicle registrations to be electric by 2023</p> <p>(lxx) 50% of entire public transport targeted to be electric by 2023</p> <p>(lxxi) Separate tariff has been included (4.5/kWh) for EVs</p> <p>(lxxii) Encourage the reuse and recycling of EV batteries that have reached the end of their lives.</p>
4.	Telangana	2018	<p>(lxxiii) Telangana State Transport Corporation has set a target of 100% electric buses by 2030 for intra-city, intercity and interstate transport</p> <p>(lxxiv) Government vehicles (owned and contractual) to switch to all electricity by 2025, phased manner</p> <p>(lxxv) Corporate offices with an annual turnover of 14.2 Million USD (INR 100+ crores) operating within Greater Hyderabad Municipal Corporation (GHMC) limits to compulsory migrate 25% of their employee commuting fleet to EVs by 2022 and 100% by 2030.</p>
5.	Andhra Pradesh	2018	<p>(lxxvi) Goal of million EVs and 100,000 slow and fast charging stations by 2024</p> <p>(lxxvii) Plans to stop registration of petrol & diesel cars by 2024 in the upcoming capital city of Amaravati</p> <p>(lxxviii) Separate tariff has been included (6.95 /kWh) for EVs</p> <p>(lxxix) All government vehicles, including corporations, boards and government ambulances to be electric by 2024.</p>
6.	Kerala	2018	<p>(lxxx) Target of bringing 1 million EVs to the state by 2022</p> <p>(lxxxi) By 2022, the state aims to pilot a fleet of 200,000 two-wheelers; 50,000 three-wheelers; 1,000 goods carriers; 3,000 buses and 100 ferry boats</p>
7.	Uttar Pradesh	2018	<p>(lxxxii) 1000 EV buses will be introduced in the state by 2030, in phases. 25% in phase I by 2020, the remaining 35% in phase II by 2022, and rest 40% in phase III by 2030</p> <p>(lxxxiii) The state will incentivize manufacturing of lithium batteries with higher mileage per charge in Uttar Pradesh. Also, the state will incentivize manufacturing of hydrogen-powered fuel cells and solar-powered cells, as an alternative clean energy source</p> <p>(lxxxiv) The state government will also provide a 100% road tax exemption for EVs purchased</p>

8.	Uttarakhand	2018	<p>(lxxxv) Aimed at making Uttarakhand a preferred destination for investment in EV manufacturing</p> <p>(lxxxvi) Special focus on developing green highways in Dehradun, Haridwar, Rishikesh, Haldwani, Rudrapur, and Kashipur.</p> <p>(lxxxvii) Term loans in the range of 1.4 Million USD to 7.1 Million USD (INR 10 crores to 50 crores) will be provided to micro, small and medium enterprises interested in manufacturing EVs</p>
9.	Bihar	2019	<p>(lxxxviii) Bihar Electric Vehicle Policy 2019 is aimed at creation of manufacturing ecosystem for e-vehicles in the State, fulfil Sustainable Development Goals (SDGs) in the transport system and make Bihar the most preferred investment destination for the EV sector</p> <p>(lxxxix) The mission of the State policy, inter alia, is to supplement the Government of India (GoI) in its mission to bring 100% e-mobility by 2030 by doing its bit</p> <p>(xc) End manual paddling of rickshaws in the state and upgrade them into 100% electric mobility by 2022</p> <p>(xci) Create fast-charging stations at every 50 km on state highways/ national highways in the state</p> <p>(xcii) Attract on-ground investments of 375.7 Million USD (INR 2,500 crores) and create direct empowerment opportunities for 10,000 persons in the state</p>
10.	Tamil Nadu	2019	<p>(xciii) The EV policy aims to make State the preferred destination for EV and component manufacturing units including battery and charging infrastructure</p> <p>(xciv) Replace 5% of ICE buses with e- buses every year and around 1000 e-buses may be introduced every year.</p> <p>(xcv) 100% conversion of all taxis and app-based aggregators in Chennai, Coimbatore, Trichy, Madurai, Salem and Tirunelveli by 2029</p> <p>(xcvi) 100% conversion of auto-rickshaws in Chennai, Coimbatore, Trichy, Madurai, Salem and Tirunelveli by 2029</p>

11.	Madhya Pradesh	2019	<p>(xcvii) The primary objective of the Madhya Pradesh Electric Vehicle Policy 2019 is to promote sustainable electric mobility and bring about a material improvement in Madhya Pradesh air quality by bringing down emissions from the transport sector</p> <p>(xcviii) The policy also seeks to put in place measures to support the creation of jobs in driving, selling, financing, servicing, charging and manufacturing of EVs</p> <p>(xcix) The policy aims to drive rapid adoption of Electric Vehicles (EV) targeting 25% of all new vehicle registration by 2024</p> <p>(c) Special Purpose Vehicle (SPV) has been constituted in 20 cities for implementing the cluster-based bus system comprising of authorities (Mayor, Collector, Municipal Commissioner/ Chief Municipal Officer, Traffic police, Regional Transport office (RTO), Police, Municipal Corporation) from various Urban Local Bodies (ULB)</p>
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Table 7 : State Level Policies

A top-level comparison of EV policy of few states is given below:

Top-Level Analysis of State EV Policies										
Parameters	Andhra Pradesh	Delhi	Karnataka	Kerala	Maharashtra	Tamil Nadu	Uttarakhand	Uttar Pradesh	Bihar	Madhya Pradesh
Policy announcement	Jun-18	Nov-18	Sep-17	Mar-19	Feb-18	Sep-19	Oct-18	Aug-19	Jun-19	Aug-19
Stage	Published	Draft	Published	Published	Published	Draft	Draft	Published	Draft	Draft
Financial Incentives										
Vehicle Segment-wise Subsidy		?		?	?				?	?

Registration Fees / Charges	?	?			?	?		?		?
Tax exemption	?	?	?		?	?		?	?	?
Home / Work Charging Infra	?	?		?						?
Supply Side										
Financial Incentives										
EV Manufacturers	?		?	?	?	?	?	?		?
Battery Manufacturers	?				?	?		?		
Public Charging Infra		?	?		?			?	?	?
Tax exemption	?	?	?			?	?		?	?
Land Subsidy	?	?	?	?		?	?	?	?	?
Grid Management										
Electricity Tariff	?	?		?	?	?	?			?
Battery Recycling and Re-use	?	?	?			?	?	?		?
Capacity Building and Skill Development	?	?		?	?	?	?			?

Benefits Provision (Total 12)	10	10	6	7	8	9	6	7	6	11
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Table 8 ? Top-Level Analysis of State EV Policies

Key actors and their roles in shaping the development of urban passenger mobility

Central Govt. / Departments/ Ministries

Ministry of Environment, Forest and Climate Change	The Ministry of Environment, Forest and Climate Change (MoEFCC) is the nodal agency in the administrative structure of the Central Government for planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programs. Information on project clearances and rules and regulations related to pollution, environmental protection, wildlife, etc. is provided. MoEFCC will be the lead partner on Component 2 related to resource use efficiency and environmental management. The Ministry is also GEF OFP India and will be part of the Project Steering Committee.
Ministry of Power	The Ministry of Power (MoP) is primarily responsible for the development of electrical energy in the country. The Ministry is concerned with perspective planning, policy formulation, processing of projects for investment decisions, monitoring of the implementation of power projects, training and manpower development and the administration and enactment of legislation about thermal, hydropower generation, transmission, and distribution. MoP will lead on approval and implementation of policies related to charging infrastructure.
Ministry of Road Transport and Highways	The Ministry of Road Transport and Highways is a Ministry of the Government of India, that is the apex body for formulation and administration of the rules, regulations, and laws relating to road transport, transport research and in also to increase the mobility and efficiency of the road transport system in India. They lead in formulating and enabling regulations to accommodate EVs on Indian roads.
Ministry of Heavy Industry and Public Enterprises	The Ministry of Heavy Industries and Public Enterprises is an executive agency of the Government of India that administers 48 central Public Sector Enterprises (PSEs) and assists them in their effort to improve capacity utilization and increase profitability, generate resources and re-orient strategies to become more competitive. The ministry serves as an interface between PSEs and other agencies for long-term policy formulation. Ministry of Heavy Industry and Public Enterprises will lead on policy and incentive mechanisms for OEMs and approval of standards on e-vehicles.
NITI Aayog	The National Institution for Transforming India, also called NITI Aayog, was formed via a resolution of the Union Cabinet on January 1, 2015. NITI Aayog is the premier policy 'Think Tank' of the Government of India, providing both directional and policy inputs. While designing strategic and long-term policies and programs for the Government of India, NITI Aayog also provides relevant technical advice to the Centre and States. NITI Aayog is responsible for developing a policy framework for incentives to promote e-mobility.

Ministry of Housing and Urban Affairs	Ministry of Housing and Urban Affairs (MoHUA), Government of India, is the apex body for formulation and administration of the rules and regulations and laws relating to the housing and urban development in India. It supports baseline investment through the Green Urban Mobility program.
Ministry of Women and Child Development (MoWCD)	The Ministry was constituted with the prime intention of addressing gaps in State action for women and children for promoting inter-Ministerial and inter-sectoral convergence to create gender equitable and child-centered legislation, policies, and programs. In this project interaction with Ministry of women and child development would be (limited to) inviting them in stakeholder consultations during policy framework preparation, and sharing of draft Policy framework for their comments
Bureau of Energy Efficiency	The Bureau of Energy Efficiency (BEE) is transforming the way energy is consumed by running several programs to efficiently use the energy and ensure its conservation by providing policy framework and coordinating. BEE is implementing several programs that demonstrate robust delivery mechanisms through Public-Private Partnerships. Ministry of Power has designated Bureau of Energy Efficiency (BEE) as the Central Nodal Agency (CNA) for the National-level rollout of charging infrastructure in the country.
Energy Efficiency Services Limited	<p>Energy Efficiency Services Limited (EESL) is a "Super Energy Service Company" (ESCO), which enables consumers, industries and governments to effectively manage their energy needs through energy efficient technologies. Founded in 2009, EESL is promoted by Government of India Ministry of Power, as a joint venture of four "public sector undertakings" - NTPC Limited, Power Finance Corporation Limited, REC Limited and POWERGRID Corporation of India Limited.</p> <p>EESL implements a very large energy efficiency portfolio across multiple sub-sectors, including lighting, buildings, electric mobility, smart metering, agriculture, etc. at a national scale. EESL's energy efficiency solutions contribute significantly to India's commitments to reduce its carbon footprint, as articulated in its Intended Nationally Determined Contributions (NDC), under the UNFCCC.</p> <p>The company deploys a unique ESCO "demand aggregation" business model, which aims to reduce upfront expenditures by consumers, and promote a "pay as you save" approach. Under GEF 6, in collaboration with UNEP and ADB, EESL is the executing agency for GEF ID 9258 "Creating and Sustaining Markets for Energy Efficiency Markets", which aims to advance a number of innovations.</p> <p>EESL will be the lead partner for executing Component 3 of the project.</p>
Society for Indian Automobile Manufacturers (SIAM)	The Society of Indian Automobile Manufacturers (SIAM) is a not for profit apex national body representing all major vehicle and vehicular engine manufacturers in India. The industry body would be an important link between the industry and the policymaking process.
Automotive Component Manufacturers Association of India (ACMA)	The Automotive Component Manufacturers Association (ACMA) is an organization representing manufacturers in the Indian auto component industry. It is associated with trade promotion, technology enhancement, quality improvement and gathering of information to help in the development of the industry. It will act as the apex body for consultation with Electric Vehicle Supply Equipment (EVSE) Vendors/ Manufacturers in India.

Society of Manufacturers of Electric Vehicles (SMEV)	SMEV is the registered association representing Indian manufacturers of electric vehicles (EV) and electric vehicle components. SMEV works closely with the central and state governments to assist formulation of policies and processes supporting the EV ecosystem. The industry body would be an important link between the industry and the policymaking process.
Electricity Distribution Companies	EDCs will be consulted on developing regulations and steps for providing connectivity for charging stations.
Urban Local Bodies (ULB)	Lead on city level intervention of the project.
Civil Society Organizations (CSOs)	Relevant CSOs will be identified and involved in design, implementation, and analysis of the marketing of e-mobility campaigns
Other private sector actors	Participant in the stakeholder platform for guiding the project work.

Table 9 ? Key Actors and their roles in EV

Important EV projects and pilots in India

Below table highlights some of the important projects:

Sanction of 6,420 e-Buses under Fame II India Scheme	<p>? Department of Heavy Industries has sanctioned 6,420 e-Buses in 21 States/UTs under FAME II scheme.</p> <p>? 300 in Andhra Pradesh, 115 in Assam, 25 in Bihar, 50 in Chhattisgarh, 25 in Dadra-Nagar Haveli, 1440 in Delhi, 590 in Gujarat, 50 in Haryana, 100 in Himachal Pradesh, 165 in Jammu and Kashmir, 390 in Karnataka, 250 in Kerala, 380 in Madhya Pradesh, 805 in Maharashtra, 50 in Odisha, 140 in Rajasthan, 525 in Tamil Nadu, 365 in Telangana, 50 in Tripura, 565 in Uttar Pradesh, 40 in West Bengal.</p>
Sanction of 2,636 EV Charging Stations under Fame II India Scheme	<p>? Department of Heavy Industries has sanctioned 2,636 charging stations in 62 cities across 24 States/UTs under FAME II scheme.</p> <p>? 317 EV charging stations have been allotted in Maharashtra, 266 in Andhra Pradesh, 256 in Tamil Nadu, 228 in Gujarat, 205 in Rajasthan, 207 in Uttar Pradesh, 172 in Karnataka, 159 in Madhya Pradesh, 141 in West Bengal, 138 in Telangana, 131 in Kerala, 72 in Delhi, 70 in Chandigarh, 50 in Haryana, 40 in Meghalaya, 37 in Bihar, 29 in Sikkim, 25 each in Jammu & Kashmir and Chhattisgarh, 20 in Assam, 18 in Odisha and 10 each in Uttarakhand, Puducherry and Himachal Pradesh.</p> <p>? 1,633 charging stations will be fast-charging stations, and 1,003 will be slow charging stations.</p>

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Limited
(EESL)

- ? EESL plans to procure and **deploy additional 2,000 e-cars across India**. Under the projects it has deployed 1564 e-cars. EESL is in process of procuring 489 more vehicles for the fleet operators
- ? 79 e-cars have been deployed in Andaman & Nicobar, 569 in Andhra Pradesh, 2 in Arunachal Pradesh, 1 in Assam ,16 in Bihar, 6 in Chhattisgarh, 524 in Delhi, 39 in Gujarat, 69 in Haryana, 92 in Jharkhand, 3 in Kerala, 57 in Madhya Pradesh, 43 in Maharashtra*, 3 in Rajasthan, 1 in Tamil Nadu, 21 in Telangana, 29 in Uttar Pradesh, 7 in Uttarakhand,3 in West Bengal
- ? EESL is also focussing on deploying charging stations across the country. It has deployed 511 AC chargers and 231 DC chargers.

State	Captive Charger-AC	Captive Charger - DC
Andaman & Nicobar	28	18
Andhra Pradesh	164	64
Arunachal Pradesh	2	0
Assam	1	0
Bihar	7	2
Chhattisgarh	2	1
Delhi	165	78
Gujarat	21	9
Haryana	24	10
Jharkhand	32	12
Kerala	1	0
Madhya Pradesh	22	14
Maharashtra	15	10
Rajasthan	1	0
Tamil Nadu	1	0
Telangana	10	6
Uttar Pradesh	12	6
Uttarakhand	2	1
West Bengal	1	0
Total	511	231

(ci)

National Highways for Electric Vehicles	<p>? India's First two E-Highways for Hybrid, Bio-Fuel Cell and Electric Vehicles with futuristic Charging Stations and EV Breakdown Services on 500 Kms Corridor Jaipur - Delhi - Agra. 18 charging stations will be setup near toll plazas on the route.</p> <p>? This program will be implemented by Ease of Doing Business Programme (EODB) of the Advance Services for Social and Administrative Reforms (ASSAR)</p>
Setting up charging and battery swapping stations ? Sun Mobility	<p>? SUN mobility, SmartE have partnered to set up charging and battery swap stations for electric two and three-wheelers in Delhi-NCR</p> <p>? Under the initiative, SmartE's fleet of electric three-wheelers will be using SUN Mobility's solution and will be deployed at SmartE Park & Charge Hubs located across Delhi-NCR in order to boost last-mile connectivity services.</p>
Setting up charging and battery swapping stations ? OLA Electric	<p>? Ola electric, BSES DISCOMs have partnered to set up charging and battery swap stations in Delhi. BSES Rajdhani Power Limited (BRPL) will set-up the station in south and west Delhi, BSES Yamuna Power Limited (BYPL) will do so in east and central Delhi</p> <p>? Ola Electric will manage and operate these stations through a cloud-based software system. BSES will facilitate in identification of strategic locations for battery swapping (and charging) stations, depending on the optimum usage and potential of electric vehicles.</p>
Attero	<p>? Attero is India's largest electronic asset management company, a clean-tech pioneer that actively promotes eco-friendly reuse and recycling of electronics. They have the capability to extract pure metals from end-of-life electronics, including Lithium-ion batteries (LIBs) in an environmentally responsible manner. They have strategic investment plans of tentative USD 100 million in setting up advanced Lithium-ion battery (LiB) reuse and recycling plant(s) in next 3-5 years in the e-Mobility domain. Attero Recycling Private Limited is a Co-financer on this project, details of which are available in Annexure I-2.</p> <p>? Attero has set up an automated and integrated Electrical & Electronic Waste recycling plant in Roorkee spread over an area of more than 100,000 sq. ft. which is capable of handling over 500 tons of e waste per month</p> <p>? Attero recycles all other types of batteries classified as e-waste such as lead acid batteries, Lithium ion batteries.</p> <p>(cii)</p>
Cero	<p>? Mahindra Accelo and MSTC Ltd. (Metal Scrap Trade Corporation Limited) have established Cero to recycle old vehicles</p> <p>? The first Cero plant is based out of Delhi NCR.</p>

Blu Smart	<p>? Blu Smart is India's first all-electric shared smart mobility platform for efficient, affordable, sustainable ridesharing</p> <p>? Blu Smart is building a comprehensive and holistic smart electric on-demand mobility platform covering the entire value chain of smart mobility, smart charging and smart parking.</p> <p>? Blu Smart had a fleet of 345 cars operating in Delhi-NCR and Mumbai in December 2019.[28]²⁸ It aims increase its fleet to 500 by March 2020, and further to 1,200 by the end of next year.</p> <p>? Blu Smart has leased 250 cars from EESL, and 250 vehicles are under process.</p>
SmartE	<p>? SmartE is India's electric mobility service, offering connectivity to tens of thousands of commuters every day. SmartE provides an environmentally sustainable solution to the first and last mile transportation opportunity in urban cities. SmartE offers shared, affordable, convenient rides in all-electric vehicles.</p> <p>? SmartE has grown its fleet of vehicles from 30 three-wheeler EVs to 1,000 electric vehicles in Delhi NCR and have served more than 50 million commuters</p> <p>? It plans to increase its fleet to 10,000 electric vehicles by 2021</p>
Bounce	<p>? Bounce is a smart mobility solution provider and dock less scooter-sharing service in India</p> <p>? In 2019 bounce introduced 1,000 electric bikes to their existing fleet of around 11,000 Internal Combustion Engine Vehicles (ICEVs)</p> <p>? Bounce is working on converting their existing ICE vehicles into EVs.</p>
Shivai e-Bus service	<p>? The Maharashtra State Road Transport Corporation (MSRTC) has launched one 43-seater e-Bus in Mumbai-Pune route.</p> <p>? MSRTC plans to launch 100 more e-Buses to be deployed in Mumbai-Pune and Mumbai-Nashik routes.</p>
Intercity e-Bus services	<p>? Prasanna Purple Mobility Solutions has launched two 43-seater e-Bus in Mumbai-Pune route.</p> <p>? It has set up charging station for buses at Pune and Mumbai and the buses can be charged fully within 90 mins.</p> <p>? It is planning to launch 6 more buses in the same route.</p>
Solar Charging Station	<p>? Magenta Power is one of the leading service providers of renewable energy solutions</p> <p>? In association with Exicom, installed India's first to boast Solar Charging Station (DC Fast Charge) for Electric Vehicles in Navi Mumbai.[29]²⁹</p>

India Charging Ahead	<p>? India Charging Ahead is a Market Report on Electric Vehicle Charging infrastructure in India published by pManifold Business Solutions. It is designed to help the industry understand the working of the business as well as the financial models at various levels in the EV & EVSE supply chain</p> <p>? The report summarises EV Charging Technology, Global & Indian EV landscape, EV Charging Business Opportunities & Business Models, Key Drivers, EV Value Chain & Players in India and EV related challenges</p>
Tata Power	<p>? Operates 350+charging stations across 60 cities and highway towns in India</p> <p>? Plans to setup 1,000 charging stations across Delhi in next 5 years</p> <p>? MoU with HPCL to setup EV charging stations at HPCL retail outlets and other locations across India</p> <p>? EESL and Tata Power, both at the forefront on enhancing EV charging Infrastructure in India are in consultations to explore synergising efforts to increase charging infrastructure network across the country. They are planning to collaborate to jointly set up EV infrastructure in India. Following are the key areas identified for collaboration: Install, Maintain &/or Operate Fast Chargers as Strategic Partners; Participation in large Govt. Tenders as Consortium Partner; Possibilities of Co-Branding & Location Sharing especially in locations where Tata Power is also power distribution licensee</p>
Maharashtra State Electricity Distribution Company Limited (MSEDCL)	<p>? MSEDCL Plans to setup 50 charging stations on the Mumbai-Nagpur 820 km corridor.</p> <p>? Plans to setup 500 charging stations across state by 2020. These stations would be setup on highway corridors</p>
Bombay Suburban Electric Supply (BSES)	<p>? BSES has signed MoU with Indian Railway to develop two charging station at two railway stations</p>
Bangalore Electricity Supply Company Limited (BESCOM)	<p>? BESCOM has planned to install 100 charging stations across 80 locations in Bangalore</p> <p>? Out of which 12 chargers will be DC chargers and 0.3 Million USD (INR 2.30 crores) has been invested for a three-year contract. Remaining chargers will be AC chargers and 0.1 Million USD (INR 92 lakhs) will be spent for a three-year contract</p>
EV Motors India	<p>? EV Motors India has formed strategic partnership with DLF, ABB, Delta Electronics to setup 6,500 charging stations (PlugNgo) in next 5 years with investment of \$ 200 million</p> <p>? Target Audience: Commercial and residential complexes</p>

National Thermal Power Corporation Limited (NTPC)	<ul style="list-style-type: none"> ? NTPC has installed First EV charging station in Vishakhapatnam ? Signed MoU with OLA, Lithium, Shuttlt, Bounce, Zoom Car, Electric for setting up Public Charging Station ? Signed MoU with city administration to setup charging facility in Jabalpur, Navi Mumbai, and Bhopal ? NTPC signed pact with Goa Govt. to setup charging infra at all major bus stands across the state
Power Grid Corporation of India (PGCIL)	<ul style="list-style-type: none"> ? PGCIL has formed strategic partnership with Hyderabad Metro Rail Ltd. (HRML). 24 charging station under construction. ? Strategic partnership with fleet operator SmartE

Table 10 ? Important EV Projects in India

To summarize, India has a mission and vision for electrification of transport sector but what lacks is a real mandate. Central Government has announced budgets and schemes for promoting the adoption of EVs, however, there is no clear roadmap to its implementation. States have defined their EV policies, but implementation is at lower pace. There is no clear target for production, sales of EVs leading to lack of volume and visibility for OEMs. Due to lack of model availability, awareness of EVs and its features, consumers are hesitant to buy EVs. This again leading to lower adoption of EVs. Additionally, inconsistent policies are adding up to the delayed decisions.

This GEF-7 India EV project will complement and play an important role in the development of integrated EV policy (including battery reuse and recycling standards and guidelines), pilot demonstrations enabling scale-up of vehicle markets and capacity development & training for raising awareness across stakeholders. This holistic approach for India can cater to the existing gaps in the ecosystem and contribute to the growth of EVs.

3) Proposed alternative scenario with a description of project components, outcomes, outputs, and deliverables

The objective of the project is:

?To enable the GoI and relevant stakeholders to make the transformative shift to de-carbonize transport systems, catalyse access to finance for a large-scale adoption of EV across vehicle segments and reduce air pollution in cities by promoting scale-up of electric mobility in India.?

It aims to provide technical assistance across a range of activities; an investment component to design, demonstrate and test financing and business models for the pilot of electric vehicle and charging infrastructure deployment. This project also focuses on promoting reuse and recycling of lithium-ion batteries. The successful demonstration of the pilot project is expected to catalyse and complement additional investment resources and participation from the private sector. The project intervention is designed to create the right enabling eco-system for entrepreneurs to scale up investment in the use of e-mobility and resultant pull for investments in the production of e-vehicles and related value chain. There will also be an impact assessment done (*budget accounted for it in the survey*) as a part of the initial stages of the project to account for the people who would lose from the transition and integrate recommendation in the outputs developed under Component 1.

The project interventions will focus on scaling up the use of e-vehicles in the cities as the driver for creating momentum and rapid increase in demand to stimulate investments that will enable faster transformation across the country. Number of passenger vehicles in the 9 biggest cities of India constitutes 17.5%^[30]³⁰ of total passenger vehicles in the country. This project also addresses the challenge of air pollution in Indian cities, where the transport sector contributes about 12% of the total pollution load in cities, thus ensuring strong support from policymakers. The National Clean Air Programme (NCAP), by the Government of India, outlines e-vehicles as one of the solutions to address air pollution including increased public transport. The project strategy is to focus on shared mobility, as this segment is the most competitive owing to the highest level of the daily utilization rate of the vehicle. Further, the project focuses on 2W and 3W vehicles as these segments contribute ~38% of total GHG emission from passenger transport. The city interventions will be in conjunction with the Smart Cities Mission of the Government of India to scale up the impacts in the country.

The proposed project activities are structured across four components, which are necessary to address the barriers and facilitate the on-going country efforts to achieve 30% Electric Vehicle sales by 2030^[31]³¹.

(ciii)

- ? **Component 1:** Integrated EV policy and framework for the e-Mobility transformation
- ? **Component 2:** Environment and resource use management framework for batteries
- ? **Component 3:** Enabling scale-up of e-vehicle markets through pilot demonstrations
- ? **Component 4:** Gender-sensitive capacity development and awareness-raising for growing e-Mobility

-

Component 1: Integrated EV policy and framework for the e-Mobility transformation (UNEP-led)

Outcome 1: Government institutionalizes integrated e-Mobility national policy framework and facilitates effective implementation of increased e-vehicle infrastructure, including its measurement and monitoring in urban areas for Cities

A key challenge identified by stakeholders was the multiplicity of authorities addressing policy and regulatory issues for e-mobility without an effective coordination mechanism, both, across different line ministries and different tiers of the government (cities, states, and center). This results in gaps in policy/regulatory framework, in-consistencies and in-effective implementation. Further at the city level, the lack of an effective integrated plan of urban mobility with the development plan results in ad-hoc decisions and ineffective implementation. The component will deliver a common vision and action plan to guide the actions by all the decision-makers as well as integrated policy framework to continuously assess the policy/regulatory needs and address them in a coordinated manner. Cities actions are guided by e-mobility action plan developed as an integral part of urban development plans in improving the mobility experience and reducing air pollution. Monitoring framework developed under the components enables the decision-makers access to up-to-date information on assessing progress to achieve the action plan and identifying gaps to design ambitious actions to achieving the e-mobility goals. Consistency and clarity in the plans and policy/regulatory framework increase the confidence of investors in establishing charging infrastructure and various segments of the transport sector to scale up the use of e-vehicles.

This component will build on learning/ knowledge materials from GEF-7 e-mobility global project working groups - specific policies, regulations, standards, fiscal measures, and other local and national incentives. This shall guide the work of preparing outputs under this component.

The outcomes for this Component will be achieved through the following Outputs and Deliverables,

Output 1.1: Integrated National Policy Framework with Elderly, Women, Children and Differently abled (EWCD) inclusive features to guide transformation to e-Mobility developed and operationalized for adoption by identified Government Authorities

Deliverables:

- 1.1.1 Integrated Zero Emission Vehicle (ZEV) Policy Guideline Framework for accelerated growth in urban e-Mobility to strengthen coordination across different level of government and effective and synergistic implementation of policies and regulations
- 1.1.2 Integrated ZEV Growth Plan with year-wise Targets, Action plan and Road map
- 1.1.3 Needs assessment of EWCD for inclusive e-mobility growth and recommendations to Integrated ZEV Policy Guideline Framework

This output will support the development of an Integrated National ZEV Policy Framework, which will provide a medium to long term vision for achieving the high growth transformation. The project will

work with different stakeholders such as for Centre, State and City governments plus industry to assess the design and implementation gaps in existing e-Mobility related policies, including for transport, urban planning, environment, energy, and finance. It will develop an assessment framework for both supply and demand-side covering elements and assess existing National and State EV policies and their effectiveness mentioned below. It will also benchmark best global practices in e-Mobility policies design, implementation and governance and their effectiveness in outcomes, including learnings from global GEF program on e-Mobility.

An assessment of the issues related to the elderly-women-children and differently-abled will be conducted to understand the prevailing issues and challenges in the sector due to the introduction of e-vehicles in the transport sector. Consultations will also be conducted with the stakeholders including manufacturers of electric vehicles and relevant government departments. Based on the assessment efforts will be made to address these concerns and integrate EWCD friendly features in the proposed EV policy framework and plan to make it more inclusive. The assessment will also include impact of green recovery post the COVID 19 from EVs including employment generation, opportunity for India to setup localized and strengthened EV supply chain, setup production facilities and attract global firms to the country. The results of this assessment will be studied, and appropriate interventions will be recommended in the development of an Integrated National ZEV Policy Framework

The gap assessment and change recommendations will be consulted with involved Government Departments and industry experts to develop High Growth Integrated ZEV Policy Guideline Framework. This will also recommend an institutional structure for effective policy implementation across different from top-to-bottom (Centre to States to Cities) and strong data-based monitoring from bottom-to-top (Cities to States to Centre).

The above guideline framework will be further appended with a detailed High Growth Integrated ZEV Plan at the National level across all design elements of the policy framework. This Plan will be developed in close consultation with different line Ministries and Nodal agencies by refining or adding appropriate EV and charging infrastructure targets across different vehicle and application segments year wise. It will lay down a roadmap with specific actions and clear responsibility between Centre, State and Cities to achieve set targets.

Output 1.2: City e-Mobility and charging infrastructure plan developed for City Administration and integrated with urban development and planning processes for cities

Deliverables:

(civ) Comprehensive e-Mobility Plan (CEMP) development and institutionalization for select 2 cities, inclusive of gender/ EWCD features

This output will support the development of a Comprehensive e-Mobility Plan (CEMP) for 2 selected cities. It will also create a model CEMP tool kit to be used by other cities and initiate its institutionalization through Ministry of Housing and Urban Affairs (MoHUA) that currently supports

cities with their conventional CMPs (Comprehensive Mobility Plan). Consultations will be conducted with women to assess their concerns and needs while designing the e-mobility plan. Efforts will be made to reduce adverse effects to women and address the safety and security concerns of women. The two cities will be selected in close coordination and consultation with government authorities and other relevant stakeholders through following selection criteria, including but not limited to i) State readiness for E mobility solutions (State EV policy and Leadership) ii) City Leadership progressiveness iii) City's EV needs (e.g. Smart Cities), private sector interest and current EV deployment success etc. iv) The diversity between cities for future scale-up; etc. The project will work closely with the **National Clean Air Programme (NCAP) team at the Ministry of Environment, Forest and Climate Change (MoEFCC)** to identify the cities/states to provide support to get additional benefits of air pollution reductions. Some of the probable city options (for shortlisting two cities) are Delhi, Pune, Mumbai, Chennai, Hyderabad, Bangalore, Kolkata, Ahmedabad, Agra, etc.

The two selected cities will be formally onboarded for GEF-7 project co-operation with commitment from State and City Authorities and will be developed as Model cities through different project components.

CEMP will act as city's charter/ vision, targets, and road map for driving e-Mobility penetration across different vehicle segments and applications year-wise till 2030. It will cover ?As-Is? transport analysis and projections by vehicle segments; their EV conversion year-wise targets and rationale; required different types of charging infrastructure (home, work, public, commercial fleet, battery swapping) for different vehicle segments and applications; electricity and grid requirements to support EV load growth; city level impact assessment on the grid, GHG emissions and air quality from EVs. It will also estimate required investments in EVs to attract and guide private investments. The CEMP will also include a strategy for integrating elderly, women, children and differently-abled (EWCD) friendly features in planning, development, and overall implementation of e-Mobility in the City. The gender assessment conducted as part of Output 1.1. for developing Integrated National policy framework, will complement in developing EWCD friendly CEMP.

Additionally, the project will help with city level resource planning and structuring of City ZEV Task Force and its institutionalization for periodic reviews and monitoring of achievements against set targets in CEMP, and inter-departmental coordination with local and state stakeholders to facilitate Govt. and private investments in the e-Mobility ecosystem in the city, including DISCOMs, Urban Local Body (ULB) and others. One of the private sector entities and a key DISCOM & charging Infrastructure pioneer in India, Tata Power has shown willingness to support the CEMP program. Tata Power is a private sector utility which has successfully utilized technology for grid planning, and is suitably placed to support CEMP with rich data analysis for load projections and grid requirements. If a formal arrangement during project implementation works out, the CEMPs would essentially aim to create enabling conditions for Tata Power investments, as well as leverage ancillarization (ie. attract supporting investments) in and around the charging infrastructure.

Output 1.3: Methodology and data needs for estimating GHG reductions developed for Cities

Deliverables:

- 1.3.1. ZEV City Connect (web portal) development for digitalization and hosting of select 2 cities? CEMP data, including periodic updates on ZEV deployment and impact metrics
- 1.3.2. GHG estimations and Air Quality Index (AQI) assessment methodology and systems development for select cities and integration into ZEV City Connect platform

A ZEV City Connect (web portal) will be created at the national level linked to City level websites connecting all Cities that have developed and implementing e-vehicle action plans. This project will support select cities with the digitalization of their CEMP on this platform. This will assist the government at different levels to track periodic updates of EV deployment and inform and attract new investments in EVs. The platform will comprise a range of data relevant to e-mobility infrastructure, investments, and environmental impact data.

This project will support the development of methodologies for modelling and measurements of GHG and Air Quality at city level from transportation, setting up of baselines and periodic estimations and measurements to assess the impact from EVs. The data collated for this analysis and tracking will be made part of the city ZEV platform. Also, this periodic data monitoring can be used by respective authorities for tracking the progress (e.g. NCAP could use the data to track the Air Quality improvements and the MoEFCC department could use the data for reporting on the GHG reductions from NDC implementation).

Component 2: Environment and Resource Use Management Framework for Batteries (UNEP-led)

Outcome 2: Policy for Lithium-Ion Battery (LIB) reuse and recycling and battery standards for EVs endorsed by the Government

A key challenge of e-vehicles is the anticipated volume of batteries that will be generated and related environmental impacts, both from materials needed for batteries and disposal of batteries. Also, as battery contributes to ~40 ? 60% of the vehicle cost and is used the maximum during the first 5 years, the residual value of e-vehicle frame is exceptionally low which increases the perceived risks of financing acquisition of e-vehicles. Opening markets for re-use of batteries post first use and recycling of batteries to extract useful material, both, help enhance the value of batteries and thus resale values of e-vehicles and reduces the impact of batteries on environment upstream from the mining of minerals.

The policy guidelines, regulations and standards for reuse and recycling will lead to the creation of a secondary market for batteries as well as investments in the recycling of batteries. The creation of value for batteries also adds value to secondhand E vehicles and facilitates reduction in financing risks which in turn increases the uptake of e-vehicles. The capacity building of policymakers will enable them to use the knowledge to continuously update the policy and regulatory framework as the battery technology advances and new materials and technologies are introduced in the market.

The component also supports the development of standards for battery swapping specially 2W (2 wheelers) and 3W (3 wheelers) to enable a business model of batteries as a service. This makes the 2

and 3W segment more competitive address a big challenge of charging anxiety by replicating the gas station model of ICEs. The standards for batteries will increase investors offering battery leasing options in the market and investments in battery swapping and battery charging services. This will also enable investments in standardized batteries as well as e-2W/3W frame manufacturers thus increasing competition in the market and drive down prices. The overall decrease in total ownership of e-2W/3W leads to an increased rate of adoption in the market.

Additionally, this component will be strongly benefitted by knowledge from GEF 7 Global E-Mobility Project Working Group on Batteries which will generate knowledge related to different types of batteries like life expectancy, toxicity, and quality issues. Indian experts will participate in the Global Thematic working Group on Charging Infrastructure, Grid Integration and Batteries. The work in this component will build on the Global project knowledge products.

The outcomes for this Component will be achieved through the following Outputs and Deliverables:

Output 2.1: Market and policy assessments conducted and policy for Lithium-Ion Battery (LIB) reuse and recycling drafted and shared with MoEFCC for adoption

Deliverables:

- 2.1.1. Market assessment for setting up Lithium-Ion Battery (LIB) reuse and recycling plants in India
- 2.1.2. Policy assessment, recommendations and roadmap development for LIB reuse and recycling for India
- 2.1.3. Effective operationalisation of LIB reuse and recycling policy through facilitation to MoEFCC for stakeholder's consultation and appropriate legislation

(cv)

This output will focus on conducting detailed market assessment for setting up Lithium-Ion Battery Reuse and Recycling plants in India. It will evaluate key technologies practiced globally and in India on key metrics of percentage recovery of metals, Capital Expenditure (CAPEX) and operating expenditure (OPEX) per ton of processing, energy and water consumption, environmental safety, and others. It will also investigate LIB waste source types, their generation volumes and collection mechanisms for plant sizing and its techno-commercial feasibility. It will estimate India's projected LIB waste generation and the number of plants required to service the needs. It will conduct environmental and economic impact from re-use and recycling of LIBs on end-users, OEMs, dealers, financiers, other key stakeholders and at overall India level.

The market and techno-commercial study will be complemented with an assessment of global best practices for LIB reuse and recycling-related policies, collection incentives and mechanisms and benefits, with special focus around EVs and secondary battery market development. It will study existing relevant policies in India and work closely with MoEFCC to strengthen existing Extended Producer Responsibility policy for Battery Management with any changes and develop operational mechanisms to drive effective execution and monitoring. It will engage and consult with industry

experts, EV OEMs, Cell and Battery OEMs, Dealers, Recyclers and EV/ Battery Financiers to ensure practicality and compliance for 100% LIB reuse and recycling and leveraging it for strengthening EV financing and increased adoption. It will analyze the opportunity for India to become a regional/global hub for LIB reuse and recycling industry and required policy support for safe importing of LIB waste.

The market and policy assessments, mentioned above, will be disseminated through active engagement of industry practitioners to allow integration of concepts of circularity and sustainable management of minerals and metal resources into their broader EV business plans and driving investments and financing of LIB reuse and recycling plants.

Output 2.2: Battery standards for EVs, including for retrofitting, battery swapping and battery leasing developed and notified by identified Government Authorities for adoption by industry

Deliverables:

2.2.1. Standards development for LIB use in EVs including retrofitting, battery swapping and battery leasing models

(cvi)

Lithium-ion batteries constitute 40-60% of EVs cost and contribute to higher cost of EVs over Internal Combustion Engine Vehicles (ICEVs). India has innovated Battery swapping model for EVs, in which LIB is not part of the EV purchase cost (~price parity with ICEV), and the user is charged for repeat use of full-charge swapping batteries (with the swap cost lower than ICEV fuel cost). This innovation delivers a lower total cost of ownership (TCO) from EVs compared to ICEVs, and at the same time keeps the initial purchase cost of EVs comparative to ICEVs. Battery swapping has the additional advantage of improving overall life and utilization of LIBs, thereby improving investment performance of swapping or energy operators. This model has taken up well in India especially in e-3Wheelers fleet and in e-2Wheelers fleet. This battery swapping innovation and its further scale-up in light EVs has the key to open mass-market adoption of EVs in both commercial fleet and individual use applications.

However, currently, there are no common standard specifications for swapping batteries and their bulk charging, and most deployments are custom-designed, limiting the scale-up across EV models/ brands and swapping or Energy operators. This impedes scaling up of battery swapping model. This output will assess existing battery swapping pilots in e-3Ws and e-2Ws and consult with different EV, battery and charger OEMs to develop common standards for batteries used in swapping. The standardization parameters for batteries will include ? battery form factor and size; min. battery effective capacity (kWh); operating voltage range; charge and discharge rates; life cycles; connector design; communication protocol; and others.

Above LIB standardization efforts to be studied and further expanded to other new applications including retrofit EVs and Battery leasing. Both these applications can be with fixed or swap batteries and will benefit from standardization of batteries to build the economy of scale and scope, and drive scale-up manufacturing of standard battery packs. It will engage on-going National efforts around standardization in EVs and Charging, including ETD-51 Committee under Bureau of Indian Standards

(BIS), Bureau of Energy Efficiency BEE and other stakeholders to mainstream battery swapping business model and mass adoption.

Component 3: Enabling scale up of e-vehicle markets through pilot demonstrations (ADB-led)

Outcome 3: *Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level.* As described in the baseline section, lack of financing is one of the major barriers to scale up EV business models across vehicle segments in India. This component will address this, and related concerns, through demonstration pilot sub-projects for 2W, 3W and 4W fleet segments. This is expected to contribute to transformative uptake of EVs in India. Through GEF funds, the demonstration of viable business & financial models will be developed. The following key barriers will be addressed:

- i) Lack of availability of financing for EV commercial fleet operations as well as retail EV financing
- ii) Limited coordinated action at the city level for developing well diverse and integrated charging infrastructure; and
- iii) Affordability of EVs, with a focus on commercial fleet.

This component will also complement city CEMP (Output 1.2) through investment readiness studies for ascertaining the market size and business proposition for different commercial electric fleet applications in up-to 5 selected cities, including cities selected for CEMP, for electric 2Ws, 3Ws and 4Ws commercial fleet operations. This outcome will build on the work carried out for the city e-Mobility and charging infrastructure plan developed for city administration and integrated with urban development and planning processes for cities as stipulated in Component 1-Output 1.2 which is led by UNEP.

In addition to financing, through technical assistance in planning & designing of city-wise charging infrastructure network, this component will address the lack of planned development of charging infrastructure across cities for effectively complementing charging solutions of commercial EV fleets in cities. It will also support the development of new business models across battery swapping and battery leasing, in conjunction with their appropriate charging infrastructure planning, which has potential to take EVs to masses, especially in 2Ws and 3Ws.

The outputs of the component will enable city authorities, urban and transport planners as well as private players, to design city-specific EV interventions leading to the effective integration of e-mobility in urban transport planning and implementation. EESL, with the strategy and better knowledge of market potential across fleet segments, will undertake better planning for rolling out charging infrastructure, developing new business models, leading to further scaled up to market operations, EV infrastructure, investment in demonstration projects for new business models and new applications.

Moreover, this component will align with, and complement, ongoing work by the Asian Development Bank through the Regional Investment Platform for e-mobility in Asia and the Pacific, as part of the GEF-7 EV Global Project. Through its regional technical assistance, ADB is supporting 23 cities in 16 countries in the transition to electric mobility.

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ADB Baseline Loan / Investment:

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ADB has been supporting India's efforts to promote energy efficient products and services which includes a \$200 million financing for the EESL's countrywide program for installing millions of energy-efficient LED lights in streets and homes and energy-efficient agricultural water pumps. This loan is associated with GEF ID 9258 "Creating and Sustaining Markets for Energy Efficiency Markets".

In November 2019, ADB approved a new loan, "Scaling Up Demand-side Energy Efficiency Sector Project" with \$250 million financing, to target upstream energy efficiency opportunities, including deployment of smart meters, distributed solar photovoltaic systems and e-vehicles in at least 15 states across India. Part of this loan (around \$ 31.8 million) will contribute to commissioning 4W e-vehicles and e-charging stations to improve transport efficiency, reduce fossil fuel consumption and improve energy security. A part of the loan will also support capacity building, raising end-user awareness and gender mainstreaming, including the training of women as commercial drivers. EESL will raise its own complementary financing of \$ 129.1 million, which will contribute towards 4W e-vehicles and e-charging infrastructure. These investments align with India's National Electric Mobility Mission Plan that aims to achieve 30% e-mobility by 2030.

While introducing technological innovations to promote energy efficiency, EESL is working on establishing new business models. To promote e-vehicles, EESL is pursuing a model of aggregating public sector demand for e-vehicles through bulk procurement. By establishing a substantial presence for e-vehicles and the supporting charging infrastructure, EESL hopes to provide impetus to domestic manufacturing that will improve affordability of e-vehicles in the Indian market. This could trigger an industrial and consumer switch to e-vehicles which would generate net environmental and economic benefits.

Awareness raising among end-users and capacity building of key government agencies' staff are key components of the project. Gender mainstreaming efforts will be promoted through provision of training to women commercial drivers, training rural women in energy-efficient technologies to expand their existing businesses or start new businesses besides sensitizing EESL project staff on gender issues.

Summary Financing Plan for ADB /EESL Investments in E-Vehicles

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Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank (ADB)[32] ³²	250.0	42.2
Clean Technology Fund (CTF) ^a	46.0	7.8
Energy Efficiency Services Limited (EESL)	296.0	50
Total	592	100

ADB will finance the expenditures in relation to: (i) smart meters; (ii) distributed solar photovoltaic systems; and (iii) e-vehicles and charging infrastructure. CTF will provide loan co-financing equivalent for distributed solar photovoltaic systems, to be administered by ADB. EESL will finance taxes, equipment installation charges, contingencies, financing charges during implementation, and the cost of awareness campaigns.

The finalized loan allocates \$ 31.8 million towards electric vehicles and associated charging infrastructure. EESL is raising funds for other sources in the order of \$ 129.1 million, to complement the financing for electric vehicles and charging infrastructure. The total estimated expenditure of \$ 160.9 million is for a cumulative target number of additional 2,000 electric vehicles (they already have deployed around 1500 e cars), with no specified target for charging infrastructure, given that NTPC, POWERGRID, DHI and private sector are also investing in this segment.

There is an attached Technical Assistance with the loan which is estimated to cost \$2.1 million, of which \$2.0 million will be financed on a grant basis by the CTF and administered by ADB. EESL will provide counterpart support in the form of counterpart staff, office accommodation, and other in-kind contributions. The TA will support EESL in implementing the project. Areas of support will include expanding policy dialogue with the government, implementing the gender action plan for the project, mobilizing private sector participation in energy-efficiency services, identifying new business opportunities, transferring knowledge about successful energy-efficiency investments, and pilot-testing new technologies and business models.

Charging Infrastructure

-

EESL has been actively playing a role in promoting the adoption and deployment of EVs and the installation of EV chargers. EESL is in the process of procuring e-cars and chargers for government use. Tender for chargers and the first lot of e-vehicles was launched in 2017. EESL is focussing on deploying charging stations across the country. It has deployed 511 AC chargers and 231 DC chargers. EESL had already awarded a tender for location, Survey Planning, supply and installation &

commissioning of 200 numbers PCS Fast Chargers across India. EESL has also issued a tender (ongoing) for deploying around additional 1020 PCS as part of GEF 6 program: GEF ID 9258 'Creating and Sustaining Markets for Energy Efficiency'. EESL is also collaborating with government and public sector agencies like BHEL, BSNL, NTPC, BEE to implement public charging infrastructure in India.

In 2018, EESL partnered with the USAID's SPARC Program to develop and implement a scalable business model for PCS. As a part of this initiative, the Program provided technical assistance to EESL in structuring a first-of-its-kind large-scale roll-out of PCS in New Delhi. The Program also supported EESL to create an enabling EV ecosystem by establishing partnerships with electricity distribution utilities, municipal corporations, and private sector players including fleet operators, metro rail corporations, etc. As of February 2020, EESL has installed more than 91 PCS of which around 55 PCS are in New Delhi. EESL now has aggressive plans to scale to more than 13 cities.

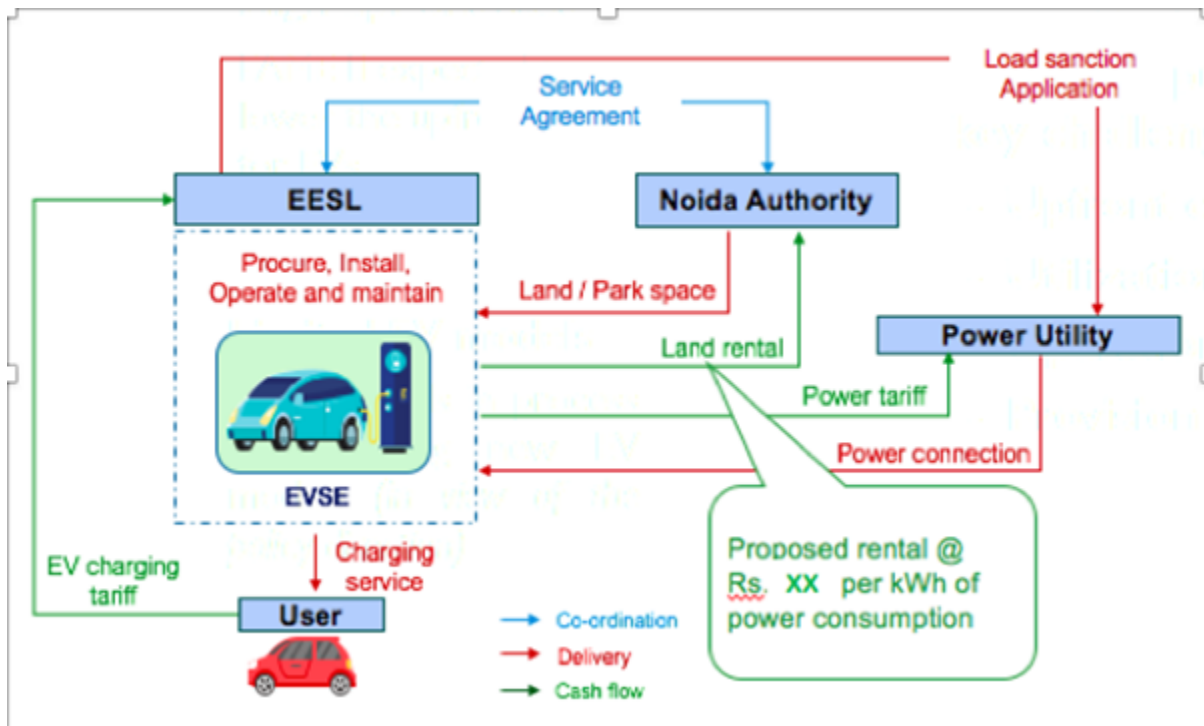
Recently on 25th July 2020, EESL has signed agreement with Noida authority for installation of public charging stations in Noida. EESL will install 162nos. of Public EV Charging Stations (PCS) comprising 54nos. of Bharat DC001 (15kW) and 108nos. of 122kW (50kW CCS2+ 50kW CHAdeMO+ 22kW Type2) Fast Chargers under FAME India Scheme Phase-II of Department of Heavy Industry (DHI). As per the DHI sanctioned letter, Energy Efficiency Services Limited (EESL) is the selected organization for deployment of PCS in NOIDA City. Additional PCS shall be deployed in consultation with NOIDA Authority.

Business Model for setting up EV Public Charging Station (PCS)

The business model designed by EESL for installation of PCS creates synergies, that benefit all the stakeholders involved because of following advantages:

- ? **Capital Investment:** EESL invests in the capital intensive EV charging infrastructure on upfront basis
- ? **Demand aggregation & Bulk Procurement:** EESL aggregates demand for chargers at the national level which helps procurement of chargers at a discounted price and makes the end-services for consumers affordable
- ? **Low cost finance :** EESL expertise to access and manage low cost funds
- ? **Revenue Sharing:** Unique mechanism of land leasing from land owner. EESL will pay some amount per kWh of units being charged by the EV on lieu of the land to CLIENT.
- ? **Affordable PCS services** for the end consumers

Agreement with Noida Authority, has been signed on revenue sharing model which is unique mechanism of land leasing from Noida authority for installation of EV chargers by EESL. The proposed model is described in the following figure.



(cvii) EESL will pay certain amount for per kWh of power consumed as rental for charging units in lieu of the land to Noida Authority. EESL will manage and operate the charging station for 10 years.

How will the GEF financing complement or provide additionality to the ADB /EESL baseline investments? The summary matrix below provides some insights:

Key Issue Area	ADB/EESL Baseline	GEF Financing
Key barrier reduction efforts	<ul style="list-style-type: none"> •EESL has deployed around 1500 EVs till date. Further, EESL has plans for deploying around additional 2000 EVs, making a total of 3500 EVs till FY24-25. •Demonstration Impact across pan India •User-Government as well private fleet •91+ Public Charging Station (PCS)commissioned 	<p>? Pilot to support new vehicle segments: e-2W and e-3W</p> <p>? Involvement of Financial institution for continued fund flow</p> <p>? Increased Private participation expected</p>

Creating enabling conditions	<ul style="list-style-type: none"> ? Expanding PCS network ? INSPIRE even to encourage start up for new EV technology & business models ? Support to Ministry for policy decisions 	<ul style="list-style-type: none"> ? Institutionalisation of Integrated e-mobility national Policy framework- clarity for Private sector investment ? Policy for Lithium-Ion Battery (LIB) reuse and recycling ? Notified Battery standards for EVs, including for retrofitting, battery ? Involvement of Financial institution for funding of EV projects across segments
Technical concerns	<ul style="list-style-type: none"> ? 4W EV business model tested however further business models /business segments/ variants needs to be piloted before large scale adoption ? Range per charge remains an issue; charging infrastructure network; standardisation of charging connectors 	<ul style="list-style-type: none"> ? Standardisation of battery especially for e2W and e3W for successful adoption of battery swapping model ? Safety concerns around battery swapping process ? Performance of retrofit models
Testing of business models	<ul style="list-style-type: none"> ? Only 4W EV business model tested ? leasing to govt. department and private fleet operators 	<ul style="list-style-type: none"> ? Business models across 2W, 3W and 4W are proposed to be tested ? Higher range 4W / multipurpose vehicle to be tested ? e-3W retrofit model to be tested; Financial institutions to be involved ? e-2W business models for last mile e-commerce delivery/hyper local delivery
Creating new markets	<ul style="list-style-type: none"> ? Initiated e-mobility adoption in India ?leased e-cars to govt. and subsequently to fleet operators ? Significant contribution to PCS 	<ul style="list-style-type: none"> ? Creating new market segment for e-2W for e-commerce delivery ? Creating new market for retrofitted e-3W by converting old ICE autos ? Special purpose vehicle might also get supported through this fund

<p>? Promoting user awareness and demand</p>	<p>? End-user energy-efficiency awareness campaigns</p> <p>? Car Launch events</p> <p>? Participation in workshops</p>	<p>? End-users education and awareness on low-carbon transportation enhanced in urban area through Forums , Road-show, workshops, events</p> <p>? Capacity development and awareness-raising plan development</p> <p>? ZEV People Connect (web portal) development with tools and regular content to educate masses on the low carbon transportation choices</p> <p>? ZEV National Connect Forum establishment and execution (through workshops, webinars, etc.) to bring together Central, State Nodal Agencies and Industries</p> <p>? City EV Engagement programs execution (through workshops, webinars, etc.)</p>
<p>? Gender dimensions</p>	<p>? Women trained as commercial drivers- 200 numbers target as part of on-going loan ?Scaling up demand side energy efficiency sector project?</p> <p>? Business plan for creation of female-only electric mobility services prepared</p> <p>? EESL staff orientation focused on the Gender Mainstreaming practices in ADB and ADB EESL partnership.</p>	<p>? Covers the entire EV ecosystem, and consider increasing participation of women: i) as users of EVs, ii) in customer care services, iii) in operations & maintenance services, iv) in value-added services in and around charging stations, v) for billing, and vi) space provision</p> <p>? Elderly, Women, Children and Differently abled (EWCD) features in the EV policy framework; and in city e-mobility and charging infrastructure plan</p> <p>? Awareness programs for customers and end-beneficiaries will ensure at least 40% women participation</p> <p>? Skills of women developed for potential employment opportunities in the E-mobility and allied sector</p> <p>? Co-benefit of GEF investment through various deliverable based activities such as webinars, workshops and training modules and IEC materials developed: Women- 2800</p>

? Adapting to new normal? (Covid-19 pandemic response)	? EESL has developed site checklist and SOP for managing risks due to COVID-19 all across EESL projects & offices (including Transportation, Warehouse, Local Storage, Installation and maintenance activities, Labor Camps etc.)	? e-2W demand for hyper local delivery is expected to increase and pilot will provide fillip to it ? For e-4W fleet operation, adequate safety measures need to in place; demand for shared mobility could be reduced however Pilot funds will help support demonstration projects
? Contribution to GHG emissions reduction	? 5114 tCO2 ? Total e-Km travelled: 28.62 million Kms ? Savings in fuel consumption: 1.91 million litres	? 621,183 tCO2 ? Total e-Km travelled: 4,319 million Kms ? Savings in fuel consumption: 326 million litres
? Scalability	? E-4W introduced in Indian market and adoption scaled up in government and private fleet operators. Additional variants/models of cars with better performance measures required for large scale adoption across Pan India	? Up Scaling in additional vehicle segment e-2W & e-3W ? Pilot testing can establish business model and financing mechanism which can lead to scaling up of EV adoption

The GEF funds will contribute to the ongoing ADB work, and will: i) provide technical support, ii) build networks and communities of practice, iii) fund training and capacity building, iv) promote Information dissemination from global working groups, and v) advance replication of lessons learned to other cities and countries, including India.

Outcome 3 will be achieved through the following outputs and deliverables:

Output 3.1: Market assessment, charging infrastructure plans, business models and financing applications developed and disseminated to city authorities and public and private entities

Deliverables

3.1.1 Market segmentation, sizing and business models developed for up to 5[33]³³ select cities for induction and scale-up of electric 2Ws, 3Ws and 4Ws in private commercial fleet

3.1.2 Citywide EV charging network plan and business models developed for up to 5 select cities for different charging requirements

3.1.3 New business and financing models for retrofitting, battery swapping and battery leasing developed

3.1.4 Risk assessments for EV Fleet Operators and end-users conducted

This output will support feasibility studies and development of new business models for key e-Mobility segments as part of Investment readiness planning. Detailed market assessment of various potential electric fleet segments in up to 5 cities will be conducted. These cities will also include cities selected for CEMP and complement Output 1.2; and will be selected during the project implementation phase with similar selection criteria as that for CEMP studies (see Output 1.2 above). Activities for this output will be coordinated under the aegis of the Nitii Ayog, including some resources for technical support.

The detailed analysis will have a suite of market assessments conducted including "As-Is" mapping of transport mode available in cities; demand assessment and market size across segments; demand forecast for 3 to 5 years? time frame; e-Mobility adoption potential across various modes (individual, corporate, government, city utilities, and others); TCO economics for the fleet; requirement of different types of charging infrastructure (home, work, public, commercial fleet, battery swap); customer behavior, Willingness to pay (WTP) and switch analysis; analysis of existing fleet operators and others.

The other activities as part of the investment readiness output will deliver a city-wide EV charging network plan and business models for up to 5 selected cities for different types of charging viz. home, work, public, commercial fleet charging hubs, thirds party charging services at street parking, battery swapping and any others. Identification and estimation of charging need assessment will be delivered for each of the city basis:

- a. Number of charging points
- b. Types of charging points
- c. Facilities to be offered apart from charging at the charging stations to increase uptake of charging infrastructure based on inputs received from consultations with various stakeholders like fuel retailers, municipalities, road authorities, commercial centers, real estate developers, network service providers etc.

Spatial planning is an important consideration for charging network planning and geographic information system (GIS) location-based map will be developed for different potential charging locations of a city. Primary research & in-person surveys will be conducted for best-fit priority charging infrastructure in the city. Network planning shall also ensure grid stability. It has been observed that delay in setting up of charging infrastructure is attributed to delay in part of sanctioning load by local distribution companies. It requires a major investment on part of distribution companies, many of which operate at a loss, to set up new infrastructure to cater to the enhanced load locally due to setting of charging infrastructure. The analysis will consider citywide load availability on local distribution transformers and grids before earmarking charging infrastructure points across cities.

Moreover, increasing mix^[34] of renewable energy in power generation would help utilize clean energy for charging purposes. The charging infrastructure network planning will also include a strategy for integrating possible elderly, women, children and differently abled (EWCD) friendly features in planning, development, and overall implementation of the charging infrastructure network planning. The gender assessment conducted as part of Output 1.1 for developing Integrated National policy framework, will complement in developing EWCD friendly charging infrastructure network planning.

Tata Power is one of the key private corporations in power sector and charging infrastructure area with which project has had extensive consultation on collaboration on city wide planning for charging infrastructure. There is likely to be a formal arrangement with Tata Power on this project during project implementation stage. Tata Power's experience in rolling out charging infrastructure across cities in India is an asset and that could be quite useful for conducting studies under this output. One of the most important elements in city wide charging network plan is load availability and load study across cities. It has been observed that delay in setting up of charging infrastructure is attributed to delay in part of sanctioning load by local distribution companies. So, it is practical for any city wide plan to account for citywide load availability on local distribution transformers and grids before earmarking charging infrastructure points across cities. Tata Power being a significant distribution company in India can bring the supply side perspective to the planning.

New business and financing models for retrofitting, battery swapping and battery leasing for mass adoption of electric 2Ws and 3Ws in cities will be developed under this output. One of the key barriers to mass adoption of EV is the higher initial acquisition cost of the vehicle. Even though the TCO of fleet EVs are lower than an ICE vehicle, due to higher initial Capex the mass shifting of the fleet to EVs has yet not been feasible. However, a mechanism to lower the initial cost of EVs through retrofitting an ICE vehicle with an EV kit and battery is being successfully tested on a small scale. The battery comprises of 40 % to 60% of the total cost of EV. Through battery swapping and battery leasing business models, the CAPEX for EV can be lowered and subsequently EV users pay for battery & charging as a service akin to paying for the fuel cost of ICEs. For mass adoption of EVs in a market like India which is dominated by 2W and 3W for Individual & public transportation, a study on retrofit, battery swapping and leasing will help understand the business models from stakeholders who are active in these segments and analysing learning from their existing experiences, besides understanding challenges and barrier related with above outlined three models.

Currently, there are very few lending institutions in the Indian market that provide financing to retail EV consumers as well as EV fleet operators. The lack of availability of financing is due to

- i. Perceived EV products? performance and technology uncertainty, primarily from battery range and life;
 - ii. High battery replacement cost within the life span of EV;
 - iii. Uncertainty in the residual value of EVs because of the absence of a second-hand market for batteries and EVs;
-

- iv. Many new OEMs and lack of EV product standards;
- v. Policy uncertainty; and,
- vi. Small and uncertain dealer volumes.

Included in this output will be a detailed assessment of financing needs of EV fleet operators and individual EV buyers. It will outline challenges faced by Financial Institutions in lending for EVs. The report will analyze different models suitable for lending and develop appropriate financing mechanisms to scale up EV financing in India. It will engage existing EV financing actors and other financing institutions (both nationalized and private banks) to ensure study outcomes and other project components help build answers to resolve systematic risks faced by the EV industry and customers. This will include the design of some National (or sub-National or project-specific) partial risk guarantee fund or other appropriate financial structures to limit risks of primary lending institutions. This combined with the above investment readiness studies will guide actual investments in select cities in commercial EV fleet pilots to resolve existing systematic barriers and guide further scalable private investments. Work under this output will guide and inform decision-making of a number of key stakeholders, including EESL, with respect to EV markets.

Output 3.2: Pilot sub-projects implemented establishing business model (2W, 3W & 4W) for further investments by public and private entities and financing institutions

Deliverables

3.2.1 Pilot sub-projects in a mix of commercial EV fleets (2Ws, 3Ws,) conducted

Under this output, GEF funds will be used to support at least one of the pilot initiatives described below: i) 2Ws, ii) 3Ws

EVs application to 2W and 3W commercial fleet segment is rapidly growing market in India and has high potential and relevance for improving first and last-mile connectivity in cities. In the last decade, 2W and 3W vehicle segments together contributed to ~38% net GHG emissions of Passenger Transport sector. Presently, some 90,000 Bike taxis exist on Indian roads and this segment is growing at a rate of 10% CAGR. The e-commerce and food delivery bikes account for 350,000 vehicles, growing at a rate of 15% CAGR. There is huge potential for conversion of these conventional bikes/scooters to e-2Ws. India adds around 500,000 3-Wheeler Autos and around 500,000 e-Rickshaws (lead-acid battery operated) every year. Retrofitting of existing 3W ICE Autos into e-Autos and adding more LIB e-Rickshaws into the growing 3W fleet has high GHG emission reduction potential. India is a price sensitive market and it makes a viable business proposition to convert ICE 3W autos to e-autos using especially designed and accredited retrofit kits^{[35]³⁵}, leading to reduction in daily operation cost of vehicles^{[36]³⁶}. One of the key purposes of retrofitting is to promote faster adoption of E-autos by reducing the investment cost for the auto-drivers cum owners which occupy the lower income

segments of the population. Moreover, retrofitted e-autos, don't require permits to ply on city roads unlike ICE autos for which limited permits are issued and renewed.

(i) *Financing Electric 2-Wheeler Commercial Fleet*

As part of this project, EESL is planning to conduct field and business model testing in e-2W e-commerce delivery market segment using GEF funds. Their current planned pilot (through GEF resources) is for around 500 e-2Ws in 2-3 cities (Mumbai, Ahmedabad, and Delhi) custom-designed for e-commerce delivery operations.

Technical specification of the e2W is as follows:

Rated Power	250-Watt Brushless DC (BLDC) Motor
Max. Power	550 Watt
Speed	25 kmph
Range	100 km per charge (ICAT testing conditions); 75 km per charge (on real road conditions)
Grade ability	17 Degrees
Brake System	FR & RR- Drum Brake
Seat Positioning	Adjustable
Dimension	1675x327x1040 mm
Loading Capacity	150 kgs
Tyre	16x3.00 Tube (Front)/ 10x3.00 Tube (Rear)
Speedometer	Analog
Voltage	60V
Battery	1.4 kWh LFP (Detachable)
Controller	Synchronous Sinewave with regeneration
Ageing Protection	Battery with automatic sleep mode
Charger specification	720Wh Charger (0.5 C)
Charging Time	150 minutes
Ground Clearance	200 mm

Table 11 ? Technical specification of the e-2W

The detachable battery system of e-2W will allow easy charging by removing the battery and charging at a convenient location, as well as provide an additional option for battery swapping.

This pilot would help establish market fit for custom e-2W e-commerce delivery solution and evolve the appropriate business and operating model.

Below table illustrates financial analysis comparison of ICE 2W v/s. e-2W, indicating that the electric vehicle has potentially better savings and viability for end-users.

Parameters	ICE 2W	Electric 2W
COST		
Vehicle Cost	1,000	600
FINANCING		
Down payment	200	-
EMI/ Lease	20 (EMI)	40 (monthly leasing cost of vehicle)
Monthly Fuel Cost	44	6
Monthly Income (after EMI and fuel expenses)	136	154

Table 12 ? Financial analysis comparison of ICE 2W v/s. e-2W

Note: All values are in USD

Following assumptions were made for the above assessment:

- ? 100 km travel per day, 28 days usage in a month
- ? Electricity Cost - USD 0.11/ kWh
- ? Equated Monthly Instalment (EMI) calculation is considered for 4 years loan period
- ? 20% down payment, remaining on loan or lease
- ? Battery size in case of e-2W is 1.4 kWh - this battery size will give 100 km range in a single charge
- ? Petrol price is USD. 1.1 / litre

? USD to INR conversion - 70

Should this initial pilot through GEF funds, give promising results, EESL will consider efforts to scale-up this pilot in more cities with multiple OEMs and fleet operators and attract more financing institutions.

(ii) *Financing Electric 3-Wheeler Retrofitted Autos (3 Wheelers are called ?Autos? in India)*

As part of this project, EESL is planning to conduct pilot testing with e-3W retrofitted Autos for passenger transport segment using GEF funds. Their current planned pilot (through GEF resources) is for around 500 such ICE retrofitted e-Autos in 2 cities (Chennai and Bangalore). Technical specification of the retrofitted e autos is as follows:

Rated Power	3.0 kW
Max. Power	5.0 kW
Speed	55 kmph
Range	110 km per charge +/- 5-10 km
Grade ability	18 Degrees
Torque	30 N-m
Loading Capacity	650 kgs
Cost of running	0.004 USD (0.35 INR/km)
Battery	5.4 kWh LFP (Detachable)
Battery Life	5 years
Home charging time	6 hours
Charge time	0.7 hours @1.4C
Motor life	6 to 8 years

Table 13 ? Technical Specifications of Retrofitted e-Autos

These retrofitted e-Autos can be personally owned by drivers or owned by a Fleet operator. The detachable battery system will allow easy charging by removing batteries and charging at a convenient location, as well as provide an additional option for battery swapping.

EESL will finance the retrofit OEM cum Aggregator to build a list of buyers and aggregate demand, retrofit vehicles into e-Autos, take care of the new EV endorsement and registration with the respective Regional Transport Office (RTO), and run battery leasing operations. The end-user will pay upfront for the retrofit kit (tentative cost USD 700 per ICE Auto retrofit plus services) and monthly payment over 5 years for leasing batteries (tentative cost USD 36 per month rent). This pilot would help establish market fit for retrofitted e-Autos and develop appropriate business and operating model.

Below table illustrates a top-level financial comparison of Compressed Natural Gas (CNG)^[37] Auto, e-Auto (with integrated battery) and Auto Retrofit; indicating that a retrofit electric vehicle has better savings and viability for end-users.

Parameters	CNG Auto	Electric Auto (Battery integrated)	Auto Retrofit
COST			
Vehicle Cost	3,200	3,200	-
Retrofit Cost (without battery)	-	-	700
Battery Cost	-	-	1,000
Total cost of 3W Auto	3,200	3,200	Upfront cost ? 700; Battery leased at monthly rental @ USD 35
FINANCING			
Down payment	640	640	700
EMI/ Lease	65	65	35
Monthly Fuel Cost	72	22	17

Monthly Income (after EMI and fuel expenses)	183	233	268
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Table 14 ? Top-level financial comparison of Compressed Natural Gas (CNG) Auto, e-Auto (with integrated battery) and Auto Retrofit

Note: All values are in USD

Following are the assumptions:

- ? 100 km travel per day, 28 days usage in a month
- ? Electricity Cost - USD 0.11/ kWh
- ? EMI calculation is considered for 4 years loan period
- ? 20% down payment, remaining on loan or lease
- ? Battery size: e-3W with integrated battery - 7 kWh, retrofit ? 5.4 kWh ? This battery size will give 100 km range on a single charge
- ? Petrol price is USD 1.1/ litre
- ? USD to INR conversion ? 70
- ? CNG Fuel Cost ?USD 0.64/ kg

(iii) Other investment options

Should the initially proposed pilots through GEF funds give promising results, EESL will consider efforts to scale-up this pilot in more cities with multiple OEMs and fleet operators and attract more financing institutions.

In case both the above proposed pilot programs (2W and 3W) fail to take off due to prevailing market conditions, it is hereby proposed that the project may explore following two options for piloting:

- 1) Second Life Battery integrated Charging Stations
- 2) Solar Powered Charging Station integrated with Battery Storage

The reason for building in this flexibility is based on lessons learned from experience with GEF ID 9258 ?Creating and Sustaining Markets for Energy Efficiency?. The GEF 6 project design, particularly the market segments for investment, would have benefitted from flexibility built in from the start, as

market conditions, business models, technology applications and consumer preferences change during the life of a project. Following are some details about the two proposed fall back pilot options:

1) Second Life Battery integrated Charging Stations: Batteries are generally recycled, disposed of, or can be refurbished for further use. The refurbishment of batteries for further use in stationary storage applications provides a lot of opportunities. Since batteries have a capacity of around 70% remaining after their first use in EV application, they can be refurbished and used for stationary storage applications, which are not demanding as that of EV application. Allowing the reuse of the batteries at the end of their useful life for an electricity storage system gives them an extended service life which in turn means better resource utilization and less environmental impact. Given the growing market for EVs, second-life batteries could also represent a market of low-cost storage solution like integrating with fast chargers in public charging stations. Benefits of utilizing used batteries with charging stations are following:

a. It will supplement the charging infrastructure where the power availability and quality is a matter of concern like rural areas

b. The availability of storage at the charging station specially on the highways will ease out the need of having a backend LT infrastructure thus reducing the overall infrastructure cost and increase the viability of the project

c. On-site battery storage at an electric vehicle station can smooth out the load profile, charging from the grid when no vehicles are present

d. Possibility of developing an integrated system of public charging station with solar power and battery storage connecting to the EV charging system.

The economic potential for battery reuse, or second-life, could help to further decrease the upfront costs of EV batteries and increase the value of a used EV.

2) Solar Powered Charging Station integrated with Battery Storage: Electric Vehicles (EV), as compared to fossil fuel cars, have considerably lower greenhouse gas emissions that can even be brought down to zero, provided green electricity is used for charging of EVs?. The standalone system purely utilizes solar power to charge the electric vehicles and stores the excess energy or the energy generated while the stations are idle in batteries. Thus, the entire system becomes clean and carbon neutral.

These systems can also be utilized where the availability of conventional grid is an issue. The charging system can be used to charge all segments of electric vehicle based on the size of the solar panel and battery used. This system will convert solar energy to electricity and stores it in a battery bank. The battery bank could be used to charge the vehicle during the night. These could be shaped as standalone carports with a roof that bears the solar panel coupled with a battery that stores generated electricity.

3.2.2 Pilot sub-projects in commercial 4W EV fleets conducted (using ADB/EESL co-finance^[38] and not through GEF funds)

Financing Electric 4-Wheeler Commercial Fleet

In 4W EVs segment, EESL has worked with multiple EV OEMs including Tata Motors, Mahindra Electric, Hyundai, and MG motors. It has bulk procured and leased cars to end-customers (government departments), as well as to other EV aggregators like BluSmart, and providing end-users with a captive or dedicated charging infrastructure. In e-4Ws (e-car) leasing, EESL has already followed two different models i) self-operating dry^[39] lease to Govt. Departments ii) dry leasing e-cars to other EV fleet operators ride-hailing and ride-sharing, corporate employees, and other passenger segments. Both these models have been facing constraints due to availability of limited performing e-cars in the market. The number of types of cars were also limited with little innovation in features and variants. However with availability of a number of better performing e-cars with higher range on single charge and driving experience close to a convention car, there is a need to further scale up these models. Both these models have scalability potential with improved EV models, improved access to charging infrastructure as services, improved access to appropriate and lower-cost financing, and finding and matching newer business segments like hotel and aviation industries. It is proposed that conducting pilot projects in leasing out high-performance e-cars which have similar driving experience to ICE, could remove the barrier of range anxiety for fleet operators especially when public charging infrastructure is inadequate.

With availability of improved models of e-4W in terms of better range, performance and features of cars compared to e-4W deployed earlier, EESL has planned to pilot launch up to 3500 e-4W across India through Co-finance ^[40] of \$160.9 million (ADB loan of \$31.8 million and through EESL raised funds of around \$129.1 million).

EESL is also exploring potential expansion of fleet leasing business to such sectors as hotel /hospitality and aviation (airport logistics) to demonstrate and increase awareness on EVs across the market spectrum and in turn, catalyse scaling up the market. There are also potential demand for special purpose EVs, for instance electric garbage lifting vehicle, multi utility vehicles for better ground operations in rural areas, electric fork-lifts, etc. Indian OEMs presently either have very limited options or do not have such special purpose vehicles. However if demand increases, EESL could utilize the fund for piloting special purposes vehicle. If determined feasible, pilots may be conducted in cities based on the assessments undertaken in output 3.1

Component 4: Gender- sensitive capacity development and awareness raising for growing e-mobility

(This component is led by UNEP)

Outcome 4: *Demand for e-vehicles stimulated through increased capacity and awareness among government, consumers and private sector stakeholders on the benefits and business opportunities for accelerating electric mobility uptake*

Through this outcome, the project will raise awareness about e mobility and benefits of EV to stakeholders across the EV value chain, namely

- 1) End-consumers, to inform and educate them on the benefits of EVs and driving change for EV purchase and use of shared e-mobility;
- 2) EV service providers (including commercial EV fleet drivers, service technicians for repair and maintenance of EVs, and financial institutions for extending EV loans), to improve services quality for better EV adoption and customer experiences; and,
- 3) Government and Industry stakeholders, to facilitate the exchange of best practices and continuous innovations and improvements for higher EV deployments.

This component will focus on capacity development and awareness-raising of key stakeholders as described above. This will include surveys to understand target segment behaviors, development of messaging for promotions and training materials, training of trainers, development of a portal to organise content, collating for dissemination best practices, exchange forums between different level of Governments and industry, and dissemination of knowledge and information to key stakeholders.

Increased information among end-users of competitiveness of e-vehicles, policies, and incentives, charging requirements and availability, as well as financing options will lead to more informed choices and increased uptake. Increased knowledge of policymaking and market dynamics of e-vehicles as well as technology development will result in better-equipped policymakers for facilitating faster transformation. Also, a better understanding of the impact of new technology on different population segments (gender, differently-abled, age, etc.) results in better design of policies, infrastructure and vehicles that equally benefits all. Increased number of trainers lead to capacities for increasing trained human resources for servicing the e-vehicles.

A detailed training and capacity building plan will be developed to inform and guide different planning and execution across the project and components. The capacity building plan will include orientation of EV manufacturers and EV service providers on including EWCD (elderly, women, children, differently-abled) and gender-inclusive features in the design of new variants and commercial EVs. This output related with the capacity building will build on insights available from the analysis of international experiences from the Global E-Mobility Programme that enabled the successful market uptake of electric vehicles through capacity building, awareness-raising and training program for stakeholders. This component will use the knowledge and solutions developed in the global component

and adapt it to the Indian context. Knowledge generated in the country will also be shared with other countries through the regional and global events organized by the Global Programme.

Output 4.1: Capacity enhanced among policymakers on considering gender mainstreaming and EWCD considerations in the e-Mobility sector

Deliverables:

- 4.1.1. Capacities of project staff enhancement on gender issues in the e-mobility sector; and practices for gender mainstreaming
- 4.1.2. Gender Action Plan implementation for mainstreaming gender/ EWCD issues across broader e-Mobility sector

The successful development of electric mobility strategies and wide adoption of electric vehicles requires gender considerations in policy development to ensure that technology equally benefits all and ensures no one is left behind. The project will explore options to integrate gender issues related to e-in mobility and work with policymakers in designing gender-inclusive policy and solutions.

A Gender Action Plan (GAP) has been developed as part of the project proposal development to ensure that the development of EV policies ensure introduction of technology benefits all stakeholders? men and women, as well as boys and girls, and differently-abled. All efforts will be made to maximize the participation of women at all stages of the project. Through the implementation of the project gender action plan, women will not only be encouraged to participate as project beneficiaries, customers, and end-users; but also, be involved as contributors towards gender-inclusive policy and project management. The Gender Action Plan aims to integrate gender equality aspects within the development of a national EV policy framework and city e-mobility plan. Targets for the participation of women are included in awareness-raising for end-users, skill training, institutional capacity building of women staff; and towards promoting gender inclusion in institutions, i.e., EESL, NITI Aayog, relevant ministries concerning e mobility adoption and city authorities. The project will explore to better understand gender-specific drivers and barriers to the adoption of electric mobility. Sex-disaggregated data and information will be collected and compiled to better understand issues and preferences of women.

Key gender Features:

- i) Gender Considerations in Policy- The project will ensure that the gender considerations are included while preparing the EV policy framework, and in city e-mobility and charging infrastructure plan. Efforts will be made to work on prevailing issues in the sector and include **elderly, women, children and differently-abled (EWCD)** features in the EV policy framework; and in city e-mobility and charging infrastructure plan. For example, the policy may encourage gender-inclusive design features in the new variants of the 2-wheelers, 3-wheelers and 4-wheelers. Similarly, the charging infrastructure plan can include measures such as well-lit parking areas, facilities/waiting areas for women and display boards with information on women-specific schemes, and women empowerment and helpline numbers within the premises.

ii) Sex disaggregated data -System and provisions will be put in place through the project MIS to collect and maintain sex-disaggregated data for all human-related parameters including on the number of women and men as participants of surveys, assessments, as end-users; and project staff, consultants, construction workforce, labour and participants in project-related training and workshops.

iii) Developing skills of women- The skill assessment for commercial drivers and service/ maintenance technicians for e-2Ws, e-3Ws and e-4Ws in select cities will make efforts to identify women keen to develop skills in the sector. The project conduct skills training for women for potential employment opportunities in the sector. A total of 200 women will be trained in relevant skills such as commercial drivers, service technicians, and in operations and maintenance work of EV fleets in select two cities.

iv) Strengthening the technical capacities of women project staff- The project will conduct city EV engagement programs. Women projects staff will be encouraged to participate in relevant knowledge events and training and capacity building activities. This will enable the women staff to enhance their technical skills which would be crucial for their future career growth.

v) Building gender capacities of project staff ? Training and orientation workshops will be conducted with project staff of EESL, NITI Aayog, relevant ministries concerning e mobility adoption and city authorities to build capacities of project staff on gender issues in the sector; and strategies and good practices for gender mainstreaming. Project staff will be oriented on gender-based violence and prevention of sexual harassment at the workplace.

vi) Strengthen gender inclusion in the institution (EESL/NITI Aayog) and Program Management- Further, a committee for prevention, prohibition, and redressal of sexual harassment at the workplace will be appointed as provisioned by GOI.

vii)

Output 4.2: End-users education and awareness on low-carbon transportation enhanced in urban areas

Deliverables:

4.2.1. Capacity development and awareness-raising plan development including gender-sensitive features

4.2.2. Surveys and behaviour assessment of end-users to learn prevailing EV awareness purchase decision making, to guide IEC materials development

4.2.3. ZEV People Connect (web portal) development with tools and regular content to educate masses on the low carbon transportation choices

viii)

This output will assess knowhow of EV choices and benefits to different categories of end-users for their personal and public transport, and their willingness to switch to EVs. One important respondent for this survey will be target users of shared commercial EV fleet for a point or leased applications across 2W, 3W, car and Bus segments. This will help understand end-user needs and preferences for EVs (including for new business models like battery swapping, leasing, and retrofitting) and further innovating EV fleet business models and developing right EV financing products. The survey results will be used to develop messaging and communications to educate targeted end-users in pilot cities through appropriate design and execution of EV social campaigns with the right partnerships. This

component will also drive content partnership with private players offering EVs and related services for developing web-based articles to educate masses on EV benefits and collate all such articles in web repository called 'ZEV (Zero Emission Vehicle) People Connect'. This platform will help institutionalize knowledge around EVs and increasing its reach and impact beyond pilot cities. The platform will have interactive content to also collect end user's survey response and feedback around EVs experience and deployment and this can be used for attracting more users on the platform.

Output 4.3: : Drivers, Service Technicians and Financing Institutions trained for strengthening EV services and access to finance

Deliverables:

- 4.3.1. IEC campaign materials development and dissemination for raising customer awareness and drive adoption of EVs (individual and shared fleet) in select cities with no gender stereotyping and including at least 40% women participation for targeted awareness programs
- 4.3.2. Skill assessment for commercial drivers and service/ maintenance technicians for e-2Ws, e-3Ws and e-4Ws in select cities with identifying women keen to develop commercial driving and technicians' skills
- 4.3.3. Training Modules development and conducting of training for drivers, service technicians and OEMs to strengthening commercial EV fleet supply eco-system in select cities skills including training for 200 women
- 4.3.4. Challenges and skill assessment for Financing Institutions (FIs) to provide and service EV loans
- 4.3.5. Capacity building and Training Modules development and execution for Trainers and end-beneficiary Financial Institutions for strengthening access to EV financing

EV services form an important linkage for end-users to experience the benefits from EVs and this includes 1) right selection and purchase at Dealers 2) Financing of EVs 3) Post-sales repair and maintenance, and 4) Driver support. It will be important to drive smooth services at these important service nodes for users to switch to EVs and share positive experiences. This output will conduct skills and knowledge assessment of service providers and their people involved in doing EV sales, EV financing, EV post-sales support and services and EV driving. These service providers will include OEMs, OEM Dealerships, Financing Institutions and Fleet Operators. The assessment results will guide the development of appropriate training materials and programs for different levels of people involved in offering these valued services to drive improved customer experiences, positive word of mouth and hence higher adoption. The designed training material will be offered by trainers to target people in EV service provider organisations in pilot cities and will be shared with partners and over the digital platform to take to more cities. This will help impart new skills and/or upgrade skills of the Indian workforce in partnership with the private sector and create new employment opportunities.

The GEF 7 global e-mobility project, having an objective to promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technologies and electric mobility, will develop a suite of tools, policy best practices, training materials and strategies to foster the large-scale market introduction of electric mobility in low- and middle-income countries worldwide. The India Child project will use the materials developed by the global project, to put in place conditions enabling

this transformation. Further, the child project will participate in the thematic working groups, through the regional support and investment platforms in Africa, Asia and the Pacific, and Latin America and the Caribbean, for exchange of knowledge and experience on a South-to-South, North-to-South and Peer-to-Peer basis. The learnings will be disseminated to all the involved stakeholders, for the betterment of the project.

The capacity building and awareness generation plan will include strategies and tools to reach out to the customers/end-users about the new technology, its key benefits and impact. Various tools such as workshops, consultations and webinars will be conducted to reach out to the target groups. The IEC material that will be developed for conducting customer awareness and promotion campaigns will include gender-sensitive elements and discourage any form of gender stereotypes. Of the project beneficiaries, at least 40% will consist of women targeted for awareness programs and related interventions.

The skill assessment for commercial drivers and service/ maintenance technicians for e-2Ws, e-3Ws and e-4Ws in select cities will make efforts to identify women keen to develop skills in the sector. The project will conduct skills training for women for potential employment opportunities in the sector. A total of 200 women will be trained in relevant skills such as commercial drivers, service technicians, and in operations and maintenance work of EV fleets in select two cities.

The gender action plan that will encompass the entire EV ecosystem, and consider increasing participation of women: i) as users of EVs, ii) in customer care services, iii) in operations & maintenance services, iv) in value-added services in and around charging stations, v) for billing, and vi) space provision.

The Gender Action Plan will encompass the entire EV ecosystem, and consider increasing participation of women: i) as users of EVs, ii) in customer care services, iii) in operations & maintenance services, iv) in value-added services in and around charging stations, v) for billing, and vi) space provision.

Output 4.4: Institutional capacity developed at Central, State and City government officials levels to improve coordinated planning and actions monitoring with private/ industry support

Deliverables:

- 4.4.1. ZEV National Connect Forum establishment and execution (through workshops, webinars, etc.) to bring together Central, State Nodal Agencies and Industries for best practices exchange to grow e-Mobility
- 4.4.2. City EV Engagement programs execution (through workshops, webinars, etc.) to drive improved, regular coordination and support to grow EVs adoption with important stakeholders (ULB, DISCOM, EV Fleet Operators, Charging or Energy Operators, Financing Institutions and others)

The capacity building of government stakeholders will be through a two-prong approach: 1) Establishment and execution of a 'National ZEV Forum' to bring together Central and State EV Nodal Agencies and Industries for best practices exchange and resolving important adoption issues. This Forum can be a mix of offline and online engagement programs for driving important EV related policy decisions and supporting improved ground deployments. 2) Development of 'ZEV City Connect' forum and conducting engagement programs to drive coordination and support for EV growth from important city stakeholders, including ULB, DISCOM, EV Fleet Operators, Charging or Energy Operators, Financing Institutions, and others. This engagement initiatives will be a mix of offline and online programs and will be driven by an objective to drive EV targets as set in CEMP for select cities and help coordinate and resolve any local city issues around EV planning and deployment. The ZEV City Connect portal will also host city CEMP planning data and will periodically track EV updates to attract better private engagement and city investments.

As there are limited women in the technical positions in the sector, hence, to strengthen their technical capacities, women from important city-level stakeholders, including from ULB, DISCOM, EV Fleet Operators, Charging or Energy Operators, Financing Institutions and others including women projects staff will be encouraged to participate in relevant knowledge events, and training and capacity building activities. Their participation in such programs will, on one hand, help integrating gender considerations and women's perspective in the sector, as well as enable the women staff to enhance their technical skills which would be crucial for their future career growth.

Further, the project will link up with and bring experiences from GEF 7 global e-mobility project and knowledge centre both at National and city levels to share innovative approaches and solutions with all engaged stakeholders at National ZEV Forum and ZEV City Connect. The project will also facilitate participation of private manufacturers in India in Global Project working groups to share experience. One of the key private players, Tata Power has shown willingness to support activities under this output. Tata Power can provide technical expertise in stakeholder consultations, seminars and workshops. This expertise would go beyond power supply, but include other elements of the EV supply chain, given that the larger business group is integrated both vertically and horizontally in the industry. Tata experts can share any advanced pre-competitive research findings, best practices and lessons, across city electricity distribution and charging infrastructure areas. The company can also be an active participant in capacity building forums through seminars, workshops, offline and online program will enrich the overall program. Tata Power also operates a Tata Power Skill Development Institute (www.tpsdi.com) which helps in training of service technician for strengthening EV services. Formal arrangements with Tata Power will be discussed and finalised during project inception.

4) Alignment with GEF Focal Area and/or Impact Program strategies

This programme is aligned with Objective 1 of the Climate Change Focal Area to 'Promote innovation and technology transfer for sustainable energy break-throughs', through CCM 1-2 - Promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technologies and electric mobility.

The overall objective of the project is to enable Government of India (GoI) and other relevant stakeholders to make the transformative shift to de-carbonize modes of transport and reduce air pollution in cities by wider up take of electric mobility.

The proposed project is structured across its components, outcomes and activities in such a way that it is in tandem with the GEF's overall and global focus areas, including GEF ID 10270: 'Global project to support countries with the shift to electric mobility' (see matrix below).

The proposed project will also be aligned to the newly launched GEF-7 Sustainable Cities Impact Program (SCIP). The Impact Program will bring cities and global expertise together and provide a forum where cities can tap into best practices for sustainable urban planning and share their experience with others. This will help cities better capture opportunities to increase the productivity of existing urban infrastructure and incorporate innovations with the potential to revamp how cities are developed and operate across a range of areas. Wherever possible, the India EV Child Project will benefit from the existing work across the cities through the SCIP as well as share the city level work with cities under the impact programme. The table below gives the linkages with the GEF ID 10270 global EV programme and the program indicators used for monitoring and reporting progress of the project.

Global Project outcome	India Project outcome	India Project Outcome level indicators	Global level Outcome level Indicators
Outcome 1: Knowledge products are generated to support policy makers and investment decision making	Outcome 1: Government institutionalizes integrated e-Mobility national policy framework and facilitates effective implementation of increased e-vehicle infrastructure, including its measurement and monitoring in urban areas for Cities	Government of India endorse a national high growth integrated ZEV policy framework	Indicator 3.1: # of countries with an improved institutional framework and a strategy to promote the uptake of low-carbon electric mobility
		Government of India endorse a national high growth Integrated ZEV plan	Indicator 3.1: # of countries with an improved institutional framework and a strategy to promote the uptake of low-carbon electric mobility
		Number of CEMPs developed	Indicator 3.3: # of countries that have improved preparedness to accelerate market transformation towards low-carbon electric mobility

	Outcome 2: Policy for Lithium-Ion Battery (LIB) reuse and recycling and battery standards for EVs endorsed by the Government	Government of India endorse standards for Lithium Ion battery retrofitting and battery swapping for electric 2Ws and 3Ws mass adoption in cities	Indicator 3.4: # of countries with measures in place to ensure the long-term environmental sustainability of low-carbon electric mobility
		Government of India endorse a policy for making LIB reuse and recycling	Indicator 3.4: # of countries with measures in place to ensure the long-term environmental sustainability of low-carbon electric mobility
<p>Outcome 2: Conditions are created for market expansion and investment in electric mobility through support and investment platforms;</p> <p>Outcome 3: Conditions are created at country and city level for the introduction of electric mobility demonstration projects, and wider up take of electric mobility</p>	Outcome 3: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level	Number of city-wide EV charging network plan and business model, for different types of charging (home, office, public, commercial fleet charging hubs) is established	Indicator 3.3: # of countries that have improved preparedness to accelerate market transformation towards low-carbon electric mobility
		A financial mechanism to facilitate the scaling-up of low-carbon electric mobility is approved (or operationalized)	Indicator 2.2: # of US\$ leveraged to scale-up low-carbon electric mobility through the support and investment platforms Indicator 3.2: # of countries with nationally generated evidence of the technical, financial and/or environmental benefits of low-carbon electric mobility
		Number of business models for electric vehicles in fleets that are recognized as being viable by key stakeholders	Indicator 2.2: # of US\$ leveraged to scale-up low-carbon electric mobility through the support and investment platforms

		Number of project concepts/proposals for investment into new low carbon electric mobility across segments	Indicator 2.1: # of countries using services and knowledge products offered by the Support and Investment Platform
Outcome 3: Conditions are created at country and city level for the introduction of electric mobility demonstration projects, and wider uptake of electric mobility	Outcome 4: Demand for e-vehicles stimulated through increased capacity and awareness among government, consumers and private sector stakeholders on the benefits and business opportunities for accelerating electric mobility uptake	The national coordination body on e-mobility generates best practices and lessons learned on low-carbon electric mobility and shares them with the global programme	Indicator 4.1: # of countries generating and sharing best practices and other lessons learned on low-carbon electric mobility with the global programme
		Awareness of sustainable low-emission transport options among end users	Indicator 3.4: # of countries with measures in place to ensure the long-term environmental sustainability of low-carbon electric mobility
		Number of public transport policy makers and transport staff and officials trained (including female staff)	Indicator 3.4: # of countries with measures in place to ensure the long-term environmental sustainability of low-carbon electric mobility

Table 15 Linkages With GEF ID 10270: Global EV Programme

5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

Baseline

India is witnessing rapid urbanization, and this has resulted in increasing demand for urban transportation. The total registered vehicles in India have grown from 89,618,267 in 2006 to 230,030,598 in 2016, a 257% increase. These vehicles are largely Internal Combustion Engine (ICE) vehicles, with a very minuscule portion of electric vehicles. Additionally, the lack of quality public transport in cities has resulted in the growing dependence on private modes. Rapid economic growth, urbanization along with rising incomes and aspirations of the population are expected to further fuel the ownership and usage of personal automobiles (especially ICE vehicles) in India cities, thereby giving a steep increase in GHG emissions and air pollution.

Promotion of e-mobility is a possible solution to the issues as outlined above and numerous policies/ standards are being made by Central and State Governments (detailed in policy sections) for promoting the adoption of EVs. Efforts are being made by Government to make a shift to renewable energy and adoption of electric vehicles (detailed in baseline section through various projects/ regulations/ policies), however, the progress is quite slow.

Central Government has announced budgets and schemes for promoting the adoption of EVs, however, there is no clear roadmap to its implementation. States have defined their EV policies, but the on-ground implementation is lacking. There is no clear target for production, sales of EVs leading to lack of volume and visibility for OEMs. Due to lack of model availability, awareness of EVs and its features, consumers are hesitant to buy EV. Further, limited access to finance due to perceived risks with the EVs limits the faster uptake. This again leads to lower adoption of EVs. Additionally, inconsistent policies are adding up to delayed decisions. The government will continue to provide limited support due to its budgetary limitation and a more fragmented implementation of various measures. Lack of information and expertise among the policy makers is likely to result in an adhoc and piecemeal approach to addressing policy and regulatory bottlenecks and less than effective implementation. This will result in slower uptake which coupled with the perceived risk of financing institutions is unlikely to slowly change visibility and perceptions of e-vehicles in the India consumers.

Alternative Scenario

The project builds on the government and private sector efforts by investing in actions that address the funding gaps. This will address the barriers/ existing issues (detailed in baseline section) where the government support is absent and will result in scaling up of the use of e-vehicles in the cities making them the driver for creating momentum and rapid increase in the scale of demand to stimulate investments that will enable faster transformation across the country.

The project resources will be utilized to develop a comprehensive institutional structure by forming a coordination mechanism where key stakeholders will work together for the execution of this project. This will help remove the barrier around the lack of coordination mechanism to implement e-mobility programs. The GEF funds will support a review of the policy and regulatory framework and develop an integrate policy framework and a growth plan as well as CEMP to guide the actions of all policy makers at tiers of the government. The project will help set national/ city wise target that will help address the barrier related with EV production targets/ sales.

The project will develop policy guidelines, regulations and standards for reuse and recycling of Lithium-Ion battery (LiB) and that will lead to creation of a secondary market for batteries as well as investments in the recycling of batteries. Also, the project will support the development of standards for battery swapping especially two-wheelers and three-wheelers to enable a business model of batteries as a service and this, in turn, will make EVs more viable commercially by lowering the initial acquisition cost.

The project will support an investment component to design, demonstrate and test business models for the pilot of electric vehicle and charging infrastructure deployment. As described in the baseline section, lack of financing and appropriate financing models is a major barrier to scale up adoption of EV business models across vehicle segments in India. The project will support analysis of various financing models and accordingly capacity building and training of financial institutions and other financial entity will be built.

In addition to financing, the proposed interventions are expected to provide technical assistance in planning & designing of the city-wise charging infrastructure network. Moreover, TA around the development of new business models across battery swapping and battery leasing, in conjunction with charging infrastructure planning TA, will address the barrier of lack of infrastructure in EV ecosystem which in turn will also address range anxiety barriers across various EV segment.

GEF support through demonstration will provide the much-needed evidence to local operators, service providers and manufacturers to expand their business operations. The barriers on supply side of limited models and makes will be resolved through GEF and co-finance pilots of 2Ws, 3Ws and 4Ws respectively. Due to these pilots, more demand of different and newer models of EVs will be encouraged. The enabling environment that will be facilitated by the project will assist to realize the alternative scenario wherein a significant proportion of vehicle population in the near is foreseen to include low emission options (e-2W, e-3W, e-4W, etc.). The demonstration and enabling policy framework will de-risk the investments and encourage private sector participation. With the facilitated market transformation from using conventional internal combustion engine to low carbon vehicles, significant energy savings and energy cost savings from the transport sector will be realized, as will be the co-benefit of reduced negative environmental and health impacts.

The project will support the development of measurable, reportable, and verifiable (MRV) system to measure, track and assess the benefits/ impacts of the proposed transport options. This increased information and its tracking on use of sustainable low-emission transport modes will create greater awareness of benefits in policymakers and users to continuously integrate new and emerging sustainable and low-emission transport options.

Besides, the project is supported by the global project. The global knowledge management component and the regional platform approach seek to bundle demand in the region and thus reduce the incremental costs:

- Generic tools are produced at global level, disseminated through regional support and investment platforms, and adapted to the needs in the country at the country level ? thus return on investment for the development of tools and methodologies is maximized.
- Investment risk for demand-side ? bundling for e-vehicles for demonstration in a certain region can lead to lower vehicle prices.
- Technology risk for supply-side ? through adequate training of vehicle operators and exchange between numerous projects, the industry is less likely to face misuse of technology.

The project will also be getting supported by partners in the form of Co-financing (In-kind and otherwise). The summary of the secured co-financing through the endorsement from the partners is shared in the table below.

No.	Co-finance partner	Nature of co-finance	Total in US\$	Description of co-finance contributions (in line with co-finance letters received from partners)
	Name	Type		
1	Energy Efficiency Services Limited (EESL)	In-Kind	\$1.32 million	EESL will provide this as in-kind support attributed to the costs incurred for setting up and housing Project Management Unit, which will manage and ensure the timely and satisfactory execution of the project over the 4 years of the project's implementation, starting late 2021
2	Energy Efficiency Services Limited (EESL)	Equity and Loan	\$129.1 million	Additional to setting up of PMC, this investment will support the outputs within Component 3 of the project i.e. Enabling scale-up of e-vehicle markets through pilot demonstrations
3	Asian Development Bank (ADB)	Loan	\$31.8 million	This co-financing forms part of the loan to EESL which is dedicated for electric vehicles and associated infrastructure and will contribute primarily to the outcome on 'Market for e-mobility stimulated and conditions for scale-up in investments for City and State action plans'.
4	Ministry of Housing and Urban Affairs (MOHUA)		\$500,000	MoHUA will help support selection of cities for CEMP and provide support to activities mainly under component 1 & 4 of this project
5	Attero Recycling Private Limited		\$60,000	Attero will share its non-confidential domain knowledge with the project implementation team through participation in relevant project activities, mainly under Outcome 2 of the project.
Total			\$162.78 million	

6) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCCF/SCCF)

Total estimated GHG emissions from India are 3,202 MtCO₂e, 6.55% of total world emissions. India is the world's third largest emitter of CO₂. The energy sector accounts for 68.7% of the total emissions in India; agriculture sector 19.6%; and industrial processes 6%. Within the energy sector, 49% of emissions were due to electricity and heat generation, 24% from manufacturing and construction and

12% from the transport sector. As per 2007 transport sector GHG inventory, road transport alone accounted for 87% of the GHG emissions. In BAU scenario from road transport, it is estimated that GHG emission will rise to 1,163.78 MtCO₂e by the year 2035 from 470 MtCO₂e in 2019.

The results of the pilot demonstration project (i.e. 500 e-2 Wheelers, e-3 Wheelers and additional 2000 e-cars) is expected to generate 201 ktCO₂e of Direct GHG emission reductions. It is estimated they will be made operational during year 2022, and benefits are accounted until year 2032 (considering a lifetime of 6 years for the 2W and e3W technology but 10 years for 4W).

Furthermore, the project is expected to generate Indirect GHG emission reductions through the country's market shift to electric mobility. These global environmental benefits assume that, starting in 2021, the share of electric 2-wheelers gradually increases from 1% to 16% by 2035; 3-wheelers from 7.2% in 2021 to 61% in 2035; private cars from 1% in 2021 to 12% by 2035 and taxis from 2% in 2021 to 32% by 2035. These estimates also consider that the electricity grid of the country considerably improves reflecting future investments in renewable power generation. As mentioned in the baseline section (under Energy landscape), the share of renewable energy has been constantly increasing. Also, the ambitious target of 450 GW by 2030 set by GoI is expected to increase the share of renewables further till 2030.

This scenario would lead to a cumulative total of 101,973 ktCO₂e Indirect GHG emission reductions and 43,703 ktCO₂e secondary direct GHG emission reductions over the 2021-2035 period (still considering a 20% causality factor) in road transport sector.

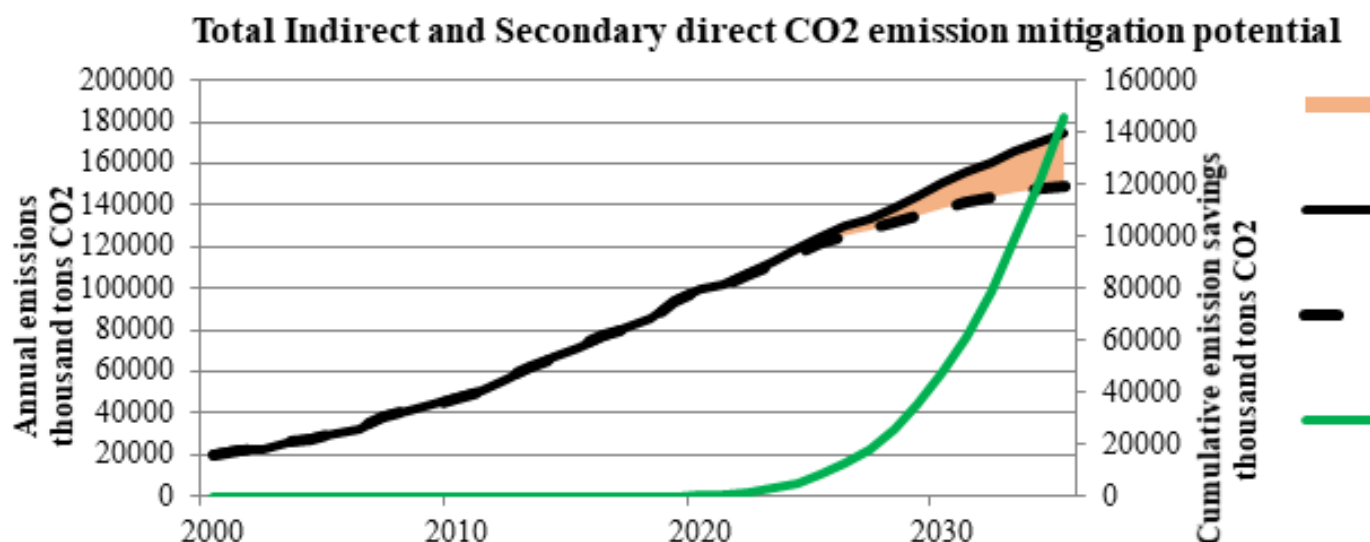


Figure 8 - Total Indirect and secondary direct CO₂ emission mitigation potential

7) Innovativeness, sustainability, and potential for scaling up

The proposed project is innovative, sustainable, and its potential for scaling up is high. Currently, EVs account for a very low share of the vehicle fleet in India. Given the environmental benefits, the ability to significantly contribute to the reduction of air pollution and economic benefits on TCO (Total Cost of Ownership) basis, there is a large potential for EVs in the Indian market. Large-scale use of electric vehicles in India can significantly reduce expenditures for oil imports and contribute to energy security.

Innovativeness:

The project takes cities as the driver for transformation to e-mobility. Project will bring up an integrated policy framework and an integrated ZEV plan bringing synergies and consistencies across the different tiers of government - Center, states, and cities - for taking effective interventions in urban transport management. A key innovation is development of Comprehensive e-Mobility Plan (CEMP) linked with urban development and mobility plans thus integrating e-mobility with the development strategy of cities. It will leverage partnership with MoHUA, driver of Smart Cities initiative, to scale up the CEMP implementation.

Other key innovation is targeting commercial fleet across 2W, 3W and 4W vehicle segments as the driver for transformation to use the private sector to strengthen and increase utilization rate of this segment. Further the focus is on structuring financing and developing commercial finance-based business models and not make the transformation on Government dependent subsidies which could be used in other segments. The project brings in financial institutes as part of change, a missing actor in India.

Environmental Sustainability:

The project implementation of electric 2W, 3W and 4W will replace the use of ICE vehicle run on conventional fuel, resulting in reduction in air pollution and GHG emissions. This transformation also enables phasing out of fossil fuel use in economy from an important segment thus contributing to the Paris Agreement outcomes. This project will also explore synergies with other ongoing/planned projects around clean energy. While planning charging network for cities, this project will look for avenues to integrate solar generated charging stations into city planning, which can feed to the energy requirements for electric vehicles.

This project will support development of methodologies for modeling and measurements of GHG and Air Quality at city level from transportation, setting up of baselines and periodic estimations and measurements to assess impact from EVs. This will provide the information for policy makers on environmental benefits and prepare evidence-based interventions.

The project will support policy and regulatory framework for re-use and recycling of batteries to ensure effective use of resources, minimize waste and environmentally safe disposal of mater that cannot be reused.

Sustainability of market development after the project:

The key to the sustainability of efforts beyond the project is that it addresses some of the key barriers that impede accelerating the adoption of EVs in India. The project by addressing the three main barriers that affect transformation to sustainable low-emission transport system ? Lack of institutional capacity and coordination to plan and develop such a system; lack of comprehensive integrated policy framework; and proven financing and business models ? enables a sustained transformation.

The project will establish an Integrated ZEV Policy Guideline Framework to strengthen coordination across different level of government and effective and synergistic implementation of policies and regulations for accelerated growth in urban e-Mobility. This will be complemented by an Integrated ZEV Growth Plan with year-wise Targets, Action plan and Roadmap.

One of the key elements of the project is the development of policy guidelines and standards to enable sustainable market development and uptake of battery reuse and recycling. This will be undertaken through the institutionalization of environmental regulations by the Ministry of Environment, Forest and Climate Change for manufacturing, use and disposal of batteries facilitating investments in the setup of recycling plants and enhanced financing across the EV value chain. Additional to this, through this project, battery standards for electric vehicles, including ones for retrofitting, battery swapping and battery leasing will be developed and notified by the Government machinery for adoption by Industry.

A significant part of the project resource is directed towards demonstrating the sustainable low-emission transport options in terms of 2W, 3W and 4W fleet transport system. The government has already committed to providing incentive through its FAME II scheme to fillip commercial fleet operations and that complements the GEF resources. Further, EESL as executing agency of this GEF project will support start-ups in 2W and 3W fleet segment and through GEF funds will further bring in Financial institution for lending EV business models across various segments of passenger mobility and goods delivery. This will be important interventions for long term sustainability of low emission transportation after this project. The demonstration projects would provide the necessary visibility to these options to end-users. The demonstration and the public awareness campaign around the demonstration projects are aimed at creating higher buy-in and behavior change. This is building of public support will create the demand for sustaining and scaling up these actions post project.

Another important element supporting sustainability is the establishment of a Measurement, Reporting and Verification (MRV) system. The MRV system will provide the necessary data to track the progress in the transformation which will help evidence-based planning as well as for using the impacts achieved in public awareness activities. These will be integrated with the Knowledge Management Repositories to support wider access to information. The Project will engage with the Climate Change Division (CCD) of MOEF&CC, which is responsible for reporting to the UNFCCC, in developing the

MRV framework. CCD is currently working on strengthening its Enhanced Transparency Framework (ETF) through Capacity Building Initiative for Transparency (CBIT) support. The MRV framework will enable India track the actions in transport sector towards meeting NDC requirements. The output will be transferred to the CCD at the end of project.

Finally, as explained in the private sector engagement the project will engage the private sector through demonstration projects with start-ups to create private sector interest in the transformation which will help sustain the activities post project. Mechanisms to leverage private sector expertise are very important to improve the penetration of EVs. The involvement of the private sector allows minimizing bottlenecks by pioneering in advanced technology, efficient operations, and improved service delivery. Since electric mobility is still evolving, the sector requires collaborative industry action between all stakeholders.

Potential for scaling-up:

The focus of the project is intervention at city level is through demonstration of EV fleet projects and development of associated charging infrastructure plan. Through proposed pilot Innovative financing mechanism like partial guarantee, the project will involve financial institution to help scale up e mobility lending. These experiences will be scaled up through replication in other cities.

The focus on commercial fleet use across 2W, 3W and 4Ws targets an important early adopter segment and has significant scale up potential. Further, 2Ws are a large segment of vehicles in India and the project enables making EV 2W competitive with ICE thus opening significant a segment for transformation.

The project endeavors to establish connection with Government and Industry stakeholders, to facilitate exchange of best practices and continuing innovations and improvements for higher EV deployments. ZEV People Connect? platform will help institutionalizes knowledge around EVs and increasing its reach and impact beyond pilot cities. The platform will have interactive content to also collect end user?s survey response and feedback around EVs experience and deployment and this can be used for attracting more users on the platform.

Given the complexity and size of Indian market, demonstration impact through this project in select cities will help establish modal validation. Involvement of financial institution in lending for e mobility will remove the key barrier for large scale scale-up of e mobility in India as well act as a hub for regional markets.

[1] CO₂ Emissions from Fuel Combustion Highlights (2019 edition), IEA 2019

[2] IEA Mobility Model 2017

[3] <https://www.statista.com/statistics/1051485/india-distribution-ghg-emmission-from-transport-sector-by-type/>

[4] Abdulla A.A. (2007) In-Depth Technology Needs Assessment on Transport Sector, Ministry Of Environment, Energy And Water, July; Projections for 2100 suggest a global mean sea level rise of a few decimetres and a greater frequency and intensity of extreme weather events. Even if emissions of greenhouse gases stop today, these changes would continue for many decades and in the case of the sea level for centuries.

[5] International Energy Agency (IEA) ? Global Energy & CO₂ Status Report, April 2019

[6] International Energy Agency (IEA) ? CO₂ Emissions Statistics

[7] 1 GtCO₂e=1000 MtCO₂e=1,000,000 KtCO₂e

[8] Intergovernmental Panel on Climate Change (IPCC) Transport Report, 2018

[9] IEA: Sustainable Development Scenario

[10] Clean Energy Ministerial (CEM): Electric Vehicle Initiative

[11] EV30@30 Scenario aims not only at the accelerated deployment of EVs but also coupled with a trajectory for power generation decarbonization consistent with the IEA's Sustainable Development Scenario.

[12] <https://www.thehindubusinessline.com/specials/india-file/interactive-india-vs-china-the-ev-dashboard/article28760479.ece>

[13] This primarily includes lead acid battery-based vehicles with low speed.

[14] The, 1.5-2 times the upfront cost requirement, ICE vs EV is generally applicable to all vehicle segments. However for three wheelers, post subsidy price parity is converging for ICE and E 3 Wheelers.

[15] <http://mospi.nic.in/statistical-year-book-india/2017/189>

[16] SMEV

[17] Central Electricity Authority (CEA)

[18] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

[19] <https://www.climatelinks.org/file/5174/download?token=n9i7kmca>

[20] <http://pib.nic.in/newsite/PrintRelease.aspx?relid=116719>

[21] <http://pib.nic.in/newsite/mbErel.aspx?relid=154119>

[22] As of 15th February 2018 (source: <http://www.fame-india.gov.in/>)

[23] <https://eeslindia.org/content/raj/eesl/en/About-Us/about-eesl/About-EESL.html>

Energy Efficiency Services Limited (EESL) is a Super Energy Service Company (ESCO), which enables consumers, industries and governments to effectively manage their energy needs through energy efficient technologies. EESL is implementing the world's largest energy efficiency portfolio across sectors like lighting, buildings, electric mobility, smart metering, agriculture, etc. In the Electric Mobility space, EESL aims to create an enabling ecosystem to: i) provide impetus for Indian vehicle

manufactures, charging infrastructure companies, fleet operators and other vendors and service providers in the industry supply chain to establish efficiencies of scale, ii) ensure affordability by driving down costs, iii) create local production capacities and iv) explore long term growth opportunities for Indian companies.

[24] <https://eeslindia.org/DMS/98b2a99e-45e9-4930-8cd0-4236ac50e77a.pdf>

[25] <http://dhi.nic.in/writereaddata/UploadFile/Standardization%20of%20protocol.pdf>

[26] 1 lakh is equal to 0.1 Million

[27] 1 Crore is equal to 10 Million

[28] <https://www.firstpost.com/tech/auto-tech/ev-taxi-aggregator-blu-smart-to-increase-fleet-in-mumbai-starting-january-2020-7793521.html>

[29] <https://www.energetica-india.net/articles/-magenta-power-sets-up-indias-first-solar-based-charging-station-for-electric-vehicles>

[30] Ministry of Road Transport and Highways

[31] EV30@30 Campaign launched by Electric Vehicles Initiative (EVI) under the Clean Energy Ministerial

[32] *ADB received a formal request of investment support of \$500 million from the Department of Economic Affairs, Ministry of Finance on 24 May 2018 for this project being processed in a phased manner. The \$250 million loan by ADB is the first phase of the investment support.*

[33] A list of cities has been identified however the selection of cities will be done during implementation stage. The probable city options as has been indicated are: Delhi, Pune, Mumbai, Chennai, Hyderabad, Bangalore, Kolkata, Ahmedabad, Agra. These are depicted on the map in section 1c and Annex E.

[34] As mentioned earlier in the baseline section under 'Energy Landscape', the share of renewable energy in the country's overall power generation rose from 5.6% in 2014-15 to 9.2% in 2018-19 and Indian government has announced an ambitious target of 450 GW of renewable energy by 2030.

[35] The engine and rest of the drive train components constituting power unit of conventional 3W autos can be replaced with simple motor-controller and battery unit. The Automotive Research Association of India (ARAI) provides certification for retrofitted vehicles.

[36] Retrofit involves replacing the fossil fuel based drive system in the auto with the electric drive system using the same body. This provides advantage to auto owners who belong to lower economic strata and can ill afford to buy a new e-auto and manage to renew their permit to ply on city roads. However they may convert their old ICE auto into a certified retrofit e-auto which will give substantial advantage in terms of running cost, besides there is no permit required and these autos are also eco-friendly.

[37] CNG auto: Compressed Natural Gas fuel based 3W Auto

[38] GEF funds will be used for piloting 2W and 3W business models whereas Co-finance funds is proposed for 4Ws.

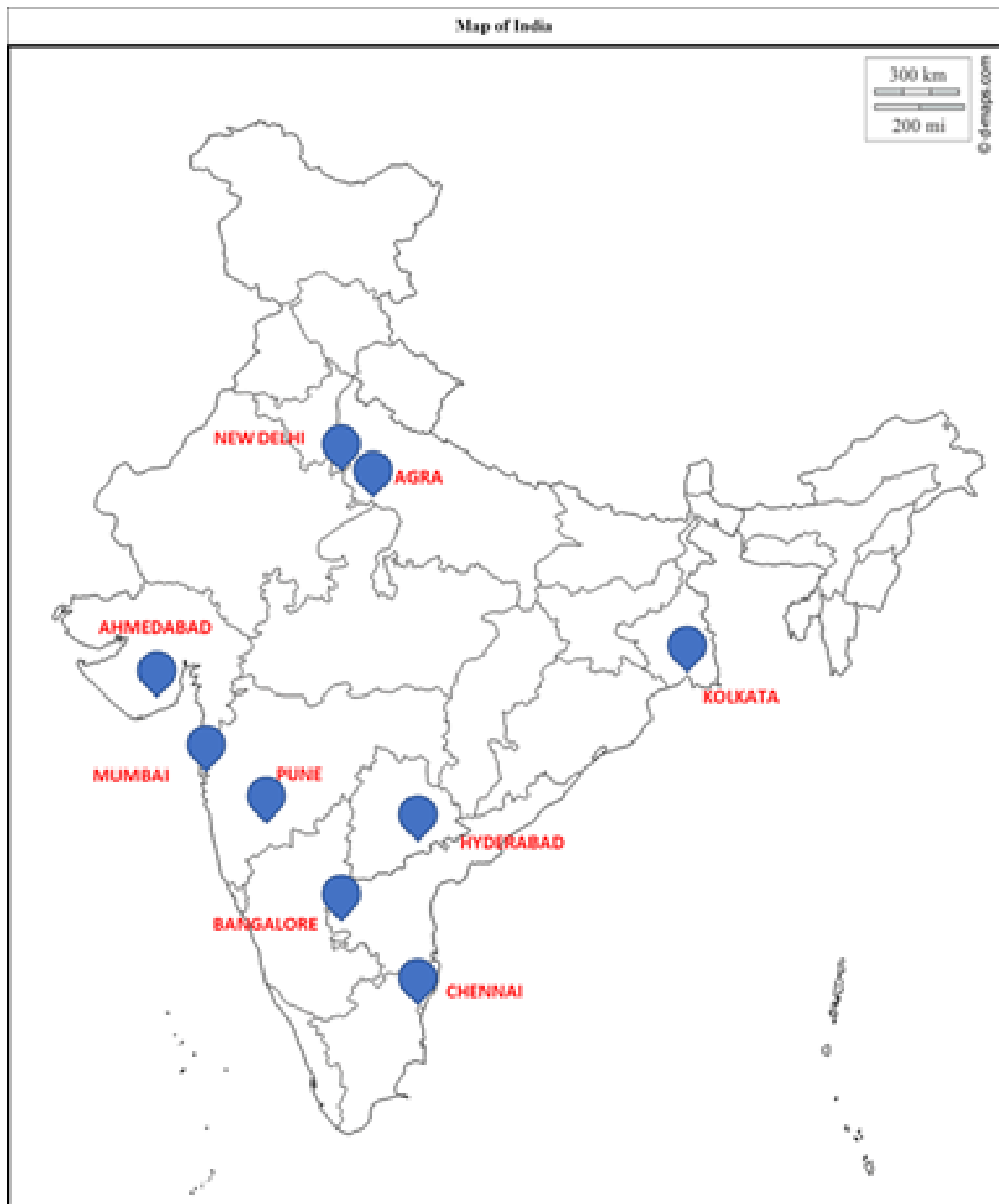
[39] Dry lease ? leasing arrangement wherein only vehicle is leased (without driver) to consumers. Unlike dry lease, wet lease is an arrangement wherein vehicle is leased along with driver.

[40] GEF funds will be used for piloting 2W and 3W business models whereas Co-finance funds is proposed for 4Ws.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

A list of cities has been identified however the selection of cities will be done during implementation stage. The probable city options as has been indicated are Delhi, Pune, Mumbai, Chennai, Hyderabad, Bangalore, Kolkata, Ahmedabad, Agra. These are depicted on the map below:



1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

The current project is hosted under the "Global Program to Support Countries with the Shift to Electric Mobility", led by UN Environment.

The Global Program to Support Countries with the Shift to Electric Mobility was submitted (June 2019 GEF Council) with child projects in Antigua and Barbuda, Armenia, Burundi, Chile, Costa Rica, India, Cote d'Ivoire, Jamaica, Madagascar, Maldives, Peru; Seychelles, Sierra Leone, Saint Lucia, Togo, Ukraine, Uzbekistan, as well as a global child project. For each child project, a concept note was prepared including national background, policy status, baseline scenario and description of individual national components.

The Global Program is divided into 4 components:

- ? **Component 1:** Global thematic working groups and knowledge materials
- ? **Component 2:** Support and Investment Platforms
- ? **Component 3:** Country project implementation
- ? **Component 4:** Tracking progress, monitoring and dissemination

The Global Program has put in place the monitoring framework below to track progress both globally and at the level of the country child projects. 10 indicators have been designed for this purpose: 4 relying on global level information (highlighted in blue) and 6 relying on country level information (highlighted in green).

Global E-mobility Programme Monitoring Framework			
Global level monitoring		Country level monitoring	
Component 1 Global thematic working groups and knowledge materials	Component 2 Support and Investment Platforms	Component 3 Country project implementation (Child Projects)	Component 4 Tracking progress, monitoring and dissemination
Outcome 1 Knowledge products are generated to support policy making and investment decision-making through four global thematic working groups	Outcome 2 Conditions are created for market expansion and investment in electric mobility through support and investment platforms	Outcome 3 Conditions are created at country and city level for the introduction of electric mobility demonstration projects, and wider up take of electric mobility	Outcome 4 Projects and electric mobility markets are tracked, and key developments, best practices and other lessons learned are shared to promote wider uptake of electric mobility
Indicator 1.1 # of knowledge products developed by the four thematic working groups and used by the Support and Investment platforms in their training and outreach activities	Indicator 2.1 # of countries using services and knowledge products offered by the Support and Investment Platform	Indicator 3.1 # of countries with an improved institutional framework and a strategy to promote the uptake of low-carbon electric mobility	Indicator 4.1 # of countries generating and sharing best practices and other lessons learned on low-carbon electric mobility with the global programme
	Indicator 2.2 # of US\$ leveraged to scale-up low-carbon electric mobility through the support and investment platforms	Indicator 3.2 # of countries with nationally generated evidence of the technical, financial and/or environmental benefits of low-carbon electric mobility	Indicator 4.2 # of e-mobility knowledge products refined based on evidence coming from the country projects
		Indicator 3.3 # of countries that have improved preparedness to accelerate market transformation towards low-carbon electric mobility	Indicator 4.3 # of non-e-mobility programme countries committing to actively promote the uptake of low-carbon e-mobility
		Indicator 3.4 # of countries with measures in place to ensure the long-term environmental sustainability of low-carbon electric mobility	

Figure 11: Global E-mobility Programme indicators

The global project will report against this framework on an annual basis, using (1) the global level data from the Global Thematic Working Groups and from the Support and Investment Platforms, and (2) country level data provided by each country project during their annual Project Implementation Review (PIR) process.

For this purpose and whenever applicable, the global level indicators highlighted in green are translated into a country-level indicator in the Project Results Framework located in Annex A of the present CEO Endorsement Document. **Table 15[1]** above presents a mapping of project indicators with the relevant programme indicators. During project implementation, EESL and NITI Aayog will be requested to report against the indicators of the country Project Results Framework (Annex A) on an annual basis, during the PIR process.

[1] The table above ?Linkages with Global Program? contains the relevant information, which contributes to the overall global program impact.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities No

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

The Stakeholder Identification and Engagement for the proposal development went through a series of meetings and workshops jointly led by UNEP and ADB, which are as follows:

•2-6 Mar 2020

- Stakeholder Consultation Workshop was conducted as part of development of GEF-7 CEO Endorsement Document to gather views and feedback on the proposed structure from diverse range of stakeholders. Some of the stakeholder groups, present at the workshop are:

i. NITI Aayog (Lead on National Mission on Transformative Mobility and Battery Storage)

ii. EESL

iii. Electric 2W, 3W, 4W Manufacturers (Maruti Suzuki, Tata Motors, MG Motors, Kinetic, Ather Energy)

iv. Electric Vehicle Fleet Operators (Bounce, Mobycy, eee-Taxi, Vidyutm Mobility, SmartE, Darwyn Ventures, Konvert India, Zyp)

v. Battery Ecosystem (Attero Recycling, Tata Chemicals)

vi. BHEL

vii. Associations/Civil Society/Research Organizations/Think tanks (Rocky Mountain Institute, World Business Council for Sustainable Development, Ease of Doing Business, Ola Electric, Automotive Component Manufacturers Association, Centre for Science and Environment (CSE), Automotive Research Association of India (ARAI)

- Meetings conducted with Energy Efficiency Services Limited (EESL), World Resources Institute (WRI), Ministry of Power (MoP), NITI Aayog, to name a few.

•18-20 Nov 2019

- Meeting conducted with Energy Efficiency Services Limited (EESL), Ministry of Power (MoP), Ministry of Road Transport and Highways (MoRTH), Society of Indian Automobile

Manufacturers (SIAM), Society of Manufacturers of Electric Vehicles (SMEV), Ola Electric Mobility Institute, to name a few

- Participation in International Workshop on Policy Framework to Deploy Electric Vehicles Charging Infrastructure in India

i. Met and consulted several stakeholders including International Energy Agency, Bureau of Energy Efficiency, NITI Aayog, NTPC, Tata Power, Delhi Distribution, BSES Yamuna Power Limited to name a few.

•11-12 Nov 2019

- EESL has organized an International Symposium to Promote Innovation & Research in Energy Efficiency (INSPIRE) event in Mumbai which was funded by ADB along with other agencies, during which there were a number of side meetings and one on one stakeholder consultations, which included a senior specialist engaged by GEF Secretariat (Mr. David Rodgers)
- Agenda on new frontiers in the e-mobility and roles of various entities/ stakeholders were conducted
- Meeting conducted with Energy Efficiency Services Limited (EESL), Ola Electric Mobility Institute, Niti Aayog, Blu-Smart Mobility, Bidgely, WRI, Tata Motors to name a few

•August 2018-Oct 2018

- There were several different iterations of a PIF immediately following the 6th GEF Assembly and launching of GEF 7. A number of stakeholder meetings were conducted during this period, with Ministry of Power (MoP), Ministry of Road Transport and Highways (MoRTH), Ministry of Heavy Industry and Public Enterprises (notably Department of Heavy Industries), Ministry of Environment, Forests and Climate Change (MOEFCC), Niti Aayog, EESL, private sector industry associations and non-government organizations (NGOs)

The above-mentioned stakeholders will be consulted on a frequent basis, through project steering committee meetings, technical working group meetings and stakeholder consultation workshops and meetings.

The **Project Steering Committee (PSC)** chaired by NITI Aayog and comprising of senior level representatives from key stakeholders will meet every 6 months to provide strategic guidance and direction to the project. **Members of the Industrial Associations will also attend at least one of the PSC meeting annually.** Also, PSC will approve the annual workplans and budget

The **Technical Working Group (TWG)** chaired by NITI Aayog and comprising of department level representatives from key stakeholders will be established as per requirements to seek inputs into specific outputs of the project. The WG will engage relevant stakeholder holders **including special**

invitee from private sector and Manufacturers from 2W, 3W and 4W. The group will also meet, as required, to ensure the coordination required for effective implementation of the project.

On similar lines, the proposed **Project Administration Unit (PAU)** ? housed at Executing Agency and the **Technical Support Unit (TSU)** ? housed at NITI Aayog will coordinate with key stakeholders on an individual basis to ensure the support required across the respective components, for the implementation of the project.

Additionally, as part of the proposed work plan and the activities/deliverables, various key stakeholders (including Private Sector and Civil Society) will be consulted and engaged through stakeholder consultation workshops and meetings.

Stakeholder Engagement Plan:

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Government	NITI Aayog	<p>The Cabinet approved the National Mission on Transformative Mobility and Battery Storage, which will drive clean, connected, shared, sustainable and holistic mobility initiatives.</p> <p>The Mission aims at creation of a Phased Manufacturing Program (PMP) for five years, to support setting up of large-scale, export-competitive integrated batteries and cell-manufacturing giga plants in India, as well as localizing production across the entire electric vehicle value chain.</p> <p>The mission is composed of an Inter-Ministerial Steering Committee, chaired by CEO NITI Aayog.</p>	<p>NITI Aayog will be the Co- Executing agency for the project and will house the Technical Support Unit (TSU) and will be responsible to execute Component 1, 2 and 4.</p> <p>The Co-Executing agency will also be responsible for coordinating with the concerned line ministries, for the support required for effective execution of the three components.</p>

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Government	Ministry of Power, The Bureau of Energy Efficiency (BEE)	<p>MoP is responsible for developing and establishing charging infrastructure in the country to enable faster adoption of EVs. Its policies permit private charging at residences and offices where tariff for supply of electricity to EV charging station shall not be more than the average cost of supply plus 15 percent.</p> <p>The Bureau of Energy Efficiency (BEE) under MoP is the Central nodal agency to act as the key facilitator in installing charging infrastructure for electric vehicles (EVs) throughout the country.</p>	<p>MoP will provide support for the execution of Component 1 and Component 3 of the project.</p> <p>BEE will provide support on Component 2 activities related to battery standards.</p>
Government	Ministry of Road Transport and Highways	<p>MoRTH announced special status and permit less ease of operation of battery-operated, ethanol powered, and methanol-powered transport vehicles, both private and commercial.</p> <p>MoRTH amended Central Motor Vehicles Rules (CMVR), 1989 to allow driving licenses to be given for age group 16-18 years to drive gearless electric scooters and bikes up to 4 kWh battery size</p> <p>MoRTH lead on formulating and enabling regulations to accommodate EVs on Indian roads.</p>	MoRTH will provide support to the Project Administration Unit and Technical Support Unit for execution of Component 1, Component 3 and Component 4.

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Government	Ministry of Environment, Forest and Climate Change (MoEFCC) Division of Hazardous Substances Management	The Ministry of Environment, Forest and Climate Change (?MoEFCC?), through a notification in the official gazette dated 20th February, 2020, has issued the Draft Battery Waste Management Rules, 2020 (?Draft Rules?), which is proposing to supersede the Batteries (Management and Handling) Rules, 2001.	<p>MoEFCC will lead the execution of Component 2.</p> <p>The Ministry is also GEF OFP India and will be part of the Project Steering Committee.</p> <p>The Ministry is also responsible for coordinating the NCAP and reporting to UNFCCC. The relevant will be engaged with the projects to ensure coordination and synergy with their efforts.</p>
Government	Ministry of Heavy Industry and Public Enterprises Department of Heavy Industry (DHI)	The department is responsible for Cabinet approved FAME II, the second phase of the scheme for Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India. The scheme has a total outlay of 1428.5 Million USD (Rs. 10,000 crores), to be used for upfront incentives on the purchase of EVs as well as supporting the development of charging infrastructure. The program will be implemented over a period of three years, effective from 1 April 2019.	DHI will provide support to the PAU and TSU for execution of Component 1 and Component 3
Government	Ministry of Housing and Urban Affairs	MoHUA houses the smart cities mission, of which a sustainable mobility is a part, also released an amendment of building code and town planning rules for provisioning of EV charging stations in private and commercial buildings.	MoHUA will provide support to the PAU and TSU for execution of Component 1, Component 3, and Component 4

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Government	Department of Science and Technology & Bureau of Indian Standards (BIS)	DST launched a Grand Challenge for developing the Indian Standards for Electric Vehicle Charging Infrastructure. Additionally, Bureau of Indian Standards (BIS) has notified general requirements for EV charging based on Combined Charging System (CCS) & CHAdeMO[1] charging standards.	DST & BIS will provide support to the PAU and TSU for execution of Component 1 and Component 2
Government	Ministry of Women and Child Welfare	As a nodal Ministry for the advancement of women and children, the Ministry formulates plans, policies and programmes; enacts/ amends legislation, guides and coordinates the efforts of both governmental and non-governmental organisations working in the field of Women and Child Development.	The Ministry will be engaged in consultation on the development gender related aspects of the project outputs. The Gender expert engaged will liaise with the Ministry continuously during the project.
Public Sector Undertaking (PSU) / GEF Executing Entity	Energy Efficiency Services Limited	EESL is currently aggregating institutional, commercial fleet (both 2/4 W also 3W retrofit) demand, while also providing the capital for e-car and charging infra investment.	<p>EESL will be the Executing agency for the project and will house the Project Administrative Unit (PAU) for execution of Component 3 and provide admin support to execution of Component 1, 2 and 4</p> <p>Will also house the responsibility of coordinating with the various 2/3/4 W vendors/suppliers/OEMs and the 2/3 W start-ups & retrofit partners for component 3 of project.</p>

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Private sector	Attero ? Electronics Asset Management Company	Attero has established one of India's largest electronics refurbishing facility, backed by cutting edge technology, to extend the useful life of old electronics and promote reuse. They are also helping integrate the informal recycling sector and establish an effective electronics take-back program through awareness events and collection drives. They are specialists in Eco-friendly Resource Recovery from E-Waste/ battery and Innovative Cleantech to Facilitate Reuse & Recycling of Electronics.	Attero will support this project for execution of Component 2. Attero will also support in facilitation to MoEFCC for stakeholder's consultation and appropriate legislation.
Private sector, OEMs	MG, TATA, Mahindra, Hyundai, Maruti Suzuki, Kinetic, to name a few.	Potential EV Original Equipment Manufacturer (OEM)	Private sector OEMs will support this project for execution of Component 3 and Component 4
Private sector, Fleet operators	Ola Electric, SmartE, Bounce, EEE Taxi, BluSmart, Lithium, to name a few.	Potential EV Fleet operators	Private sector Fleet operators will support this project for execution of component 3.
Private sector, Start-ups	Darwyn (two-wheeler), Convert India (three-wheeler)	Potential EV stakeholders (start-ups)	Private sector, start-ups will support this project for execution of Component 3.
Utilities / Distribution companies	Tata Power Delhi Distribution, BSES Yamuna Power Limited, BSES Rajdhani Power Limited	Power distribution and grid specialization for charging infrastructure development in India	Utilities will support this project for execution of Component 1 and 3 and 4.

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Civil Society Organizations	Centre for Study of Science, Technology and Policy (CSTEP), Center for Science and Environment (CSE), World Resources Institute (WRI), to name a few.	Research, policy advocacy, awareness, and capacity building around Electric Vehicles.	Civil society organizations[2] will support this project for execution of activities within Component 4. They will also be engaged in the consultations on outputs developed under other components. CSOs working on gender and development will be engaged in development of gender related outputs as well as in the training component.
Industrial associations	ICLEI ? Local Governments for Sustainability, Society of Indian Automobile Manufacturers (SIAM), Society Of Manufacturers Of Electric Vehicles, Federation of Indian Chambers of Commerce & Industry (FICCI), Confederation of Indian Industry (CII)	Provide a platform for networking and consensus building within and across sectors for Indian industry, policy makers and the international business community.	The project will benefit from engaging industrial associations while in the implementation phase as they work closely with cities. Their contribution will be across components.

Stakeholder main group	Stakeholder name	Existing activities with potential to be leveraged	Content engagement, contributions to the project (identified by Component)
Public Sector Undertaking	Bharat Heavy Electricals Limited, NTPC	BHEL is developing charges also they have already developed, and certified testing also has been done around the DC 001. They have done 50KW charger and tested it with some of the protocols already. Now setting up charging infrastructure for highways	BHEL will support this project for execution of component 3.

[1] It is trade name for Direct Current based fast charging method.

[2] CSOs working on gender and development will be identified and involved during consultations and also during implementation of project gender action plan. Some of these are namely, Azad Foundation, International Center for Research on Women (ICRW), Jagori, Creating Resources for Empowerment in Action (CREA), Centre for Social Research (CSR),etc.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

See Stakeholder Engagement Plan above.

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor;

Co-financier;

Member of project steering committee or equivalent decision-making body;

Executor or co-executor;

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

While the level of urbanization is low in India[1] as compared with other major countries (India 33%, vs. 54% in Indonesia, 56% in the People's Republic of China, and 82% in the Republic of Korea), still India is home to five megacities, defined by the United Nations as having more than 10 million inhabitants?New Delhi, Mumbai, Kolkata, Bengaluru, and Chennai. These mega cities as well as many other smaller cities in India, face the challenges of access to basic infrastructure services, affordable housing, public transport, and proper waste disposal / management.

The urbanization in India has been accompanied by increased motorization. There is a broad consensus amongst policy makers, researchers, and practitioners that urban India's existing travel mode share, is dependent on walking, cycling, bus-based public transport and intermediate public transport needs to be preserved. However, policies and investments focusing on sustainable modes of transport have largely ignored the women perspective in their planning. [2] This is a missed opportunity as data from the Census of India (2011) shows that around two out of three female workers in urban areas commute for work, and a higher proportion of women (72%) compared to men (61%) walk, cycle and use bus-based public transport. The predominant policy focus on tracking women's movement and increased surveillance to create safer public transport does not capture how women's mobility depends on service reliability, scheduling, affordability of public transport and infrastructure and behavior of public transport frontline workers.[3]

According to a study by the McKinsey Global Institute, Indian women contributed just 17% of national GDP, less than half the global average of 37%. Though, India could boost its GDP by USD 0.7 trillion in 2025 with about 70% of the increase coming from bringing 68 million more women into the economy. If women were to play an equal role in labor markets, as much as USD 28 trillion could be added to the global economy by 2025. Yet, female workforce participation rate has dropped by 12.3% in 10 years it decreased from 36% in 2005-06 to 24% in 2015-16.

Today, women do not participate in the economy freely because of mobility constraints, among various other reasons. Thus, this will require addressing multiple gender gaps and one to these could be to direct urban transport investments to cater to women and girls as transportation is not merely an infrastructure but the means to participate in the work force and to live a fuller life.

Gender considerations are crucial as women and men may differ in their priorities about using the transport systems and in their mobility related needs. The abilities to access transport may also differ.

While safety is important, women's choice of different modes of mobility is also determined by aspects of comfort, accessibility, affordability, reliability, and coverage (especially in the case of public transport). In view of this, Ola Mobility Institute's study on women's urban mobility preferences and choices is informative. The research undertook a gender disaggregated analysis to develop urban mobility indicators. The analysis revealed that women were constantly making decisions about their commuting modes. Even though there was not a significant difference between men and women's perceptions of streets and public transport, there was a sharp difference in the use of public transport modes. While women constituted around 38% of bus users and 35% of metro/train users, they were 40-45% of auto-rickshaw, on-demand taxi, and shared public transport users. This may be due to the convenience offered by these services, especially for short travel distances. Further regarding the safety concerns of women, the study reveals that 91% of women felt that public transport was very unsafe, unsafe, or somewhat unsafe. Women are willing to use public transport with 96 % prioritizing affordability, coverage, frequency, safety, and comfort. Safe, comfortable, convenient and affordable transport can play an important role in not only helping meet women's practical needs such as access to education and health services, banks and markets, but also in contributing to their strategic empowerment by facilitating access to social and economic opportunities. Sustainable urban development will remain elusive without integrating women and girls' safety, comfort, convenience, and affordability in urban transport.

It is pertinent that the above concerns of women are considered and included through the current project while formulating the E-vehicle policies, frameworks, and city-wide infrastructure plans for the Electric-Mobility transformation. While electric vehicles as such may have limited gender issues, the introduction of new vehicles and new public transport systems using electric vehicles is likely to have major gender implications. With the introduction of electric taxis, electric 3-wheelers, and 2-wheelers opportunities exist to address gender issues. Replacing petrol 4 and 2 wheelers including scooters and taxis with electric ones provides opportunities to integrate gender considerations. For example- It is interesting to know that in India about a quarter of scooter buyers are women. In an otherwise sluggish 2-wheeler market, the demand for scooters has been growing, primarily due to an expanding base of women drivers. There are more women buyers now as compared to earlier. Now, more than a quarter of new scooters are being registered in the names of women buyers. Moreover, the companies are making special efforts to attract women buyers such as introducing female friendly variants and organizing driving training for female customers to boost sales.^[4] Other strategies including subsidies for women buyers can be explored to boost mobility for women and also raise sales.

On the other hand, at times there are challenges in attracting women customers in 2-wheeler mobility services. Owing to cultural and social constraints women in India are reluctant to sit cross legs and hold onto the driver when seated on the back of the motorcycle. These issues need to be taken into considerations while design and assembling the new variants of electric 2-wheelers, and the 2-wheelers need to be customized in such a way that women can hold onto custom designed grips and no longer need to hold on to the driver. These may have positive results and facilitate in increasing women customer base. Moreover, these customized solutions can also be explored to facilitate a smooth and

safe journey for not only women passengers but also make the life of elderly or differently abled users safe. Though these design features may not be related to the electrification of motorcycles, the proposed E-policy and framework and introduction of fleets of newly designed 2-wheelers, 3-wheelers and 4-wheelers provides opportunities to integrate elderly-women-children and differently-abled (EWCD) friendly features and gender considerations. Such issues will be further explored and addressed during developing the policy and frameworks. The project will also draw on lessons learnt from the ongoing global project GEF ID 10270: 'Global Programme to Support Countries with the Shift to Electric Mobility' on key gender issues, strategies and good practices related to the EV market in other countries.

All efforts have been made to encourage participation of women at all stages of the project. Women will not only be encouraged to participate as project beneficiaries, customers, and end users; but also, be involved as contributors towards gender inclusive policy and project management. The successful development of electric mobility strategies and wide adoption of electric vehicles requires gender considerations in policy development. The project will explore options to integrate gender issues in mobility and work with policymakers in designing gender-inclusive policy and solutions. A project **Gender Action Plan (GAP)** has been developed as part of the project, to ensure that the development of EV policies considers the mobility needs and characteristics of men and women, as well as boys and girls.

The Gender Action Plan aims to integrate gender equality aspects within the development of national EV policies. Targets for participation of women are included in awareness raising for end-users, skill training, institutional capacity building of women staff; and towards promoting gender inclusion in institutions, i.e., EESL and NITI Aayog. The project will explore to better understand gender specific drivers and barriers to the adoption of electric mobility and mobility needs of women and girls. Sex-disaggregated data and information will be collected and compiled to better understand issues and preferences of women.

Gender Action Plan-Key Features:

? *Gender Considerations in Policy* - The project will ensure that the gender considerations are included while preparing the EV policy framework; and in city e-mobility and charging infrastructure plan. Efforts will be made to work on prevailing issues in the sector and include elderly, women, children and differently abled (EWCD) features in the EV policy framework; and in city e-mobility and charging infrastructure plan. For example, the policy may encourage gender inclusive design features in the new variants of the 2-wheelers, 3-wheelers and 4-wheelers. Similarly, the charging infrastructure plan can include measures such as well-lit parking areas, facilities/waiting areas for women and display boards with information on women specific schemes, and women empowerment and helplines numbers within the premises. Agencies including NGOs and CSOs working on women's issues esp. mobility

will be consulted while developing the gender content for the Policy framework. Interaction will be conducted with Ministry of Women and Child Development inviting them in stakeholder consultations during policy framework preparation; and sharing of draft Policy framework for their comments.

? *Sex disaggregated data* - System and provisions will be put in place through the project management information system (MIS) to collect and maintain sex disaggregated data for all human related parameters including on number of women and men as end-users, project staff, consultants, construction workforce, labor and participants in project related trainings and workshops.

? *Women's participation in awareness raising activities* - Awareness raising on the benefits of electric mobility is one of the main components of the program. It will include targeted campaigns aimed specifically at women and mobility needs for families. At community level, awareness programs for customers and end-beneficiaries will ensure at least 40% women participation.

? *Gender considerations in Information, Education and Communication (IEC) material* - The IEC material will be developed for conducting customer awareness and promotion campaigns which will include gender sensitive elements and discourage any form of gender stereotypes.

? *Developing skills of women* - the project will conduct skills training for women for potential employment opportunities in the sector. A total of 200 women will be trained in relevant skills such as commercial drivers, service technicians, and in operations and maintenance work of EV fleets in select two cities.

? *Strengthening technical capacities of women project staff* - The project will encourage participation of women project staff in all knowledge events, and training and capacity building activities. This will enable the women staff to enhance their technical skills which would be crucial for their future career growth.

? *Building gender capacities of project staff*? Trainings and orientation workshops will be conducted with project staff of EESL and NITI Aayog to build capacities of project staff on gender issues in the sector, and strategies and good practices for gender mainstreaming. Project staff will be oriented on gender-based violence and prevention of sexual harassment at workplace.

? *Strengthen gender inclusion in institution (EESL/NITI Aayog) and Program Management* - Further, as per GOI norms a committee for prevention, prohibition, and redressal of sexual harassment at workplace will be appointed as provisioned by GOI.

? *Monitoring and Reporting on gender activities* ? A training and capacity building expert will be mobilized to prepare the training and capacity building plan and IEC material. A gender specialist consultant will be recruited to support implementation of the gender actions. Additionally, a senior officer in the project's TSU would be designated as gender focal point to oversee implementation, monitoring and reporting of gender action plan. An agency will be engaged to conduct the community/end-user awareness programs.

Gender action plan progress will be monitored regularly and reported every quarter with the project progress reports.

The project will include provisions to the effect that contractors follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for work), health, safety, welfare, sanitation, and working conditions. Such contracts shall also include causes for termination in case of any breach of the stated provisions by the contractors. Entities responsible for implementation of gender action plan would be Project Administration Unit (PAU) and Technical Support Unit (TSU), housed at Executing Agency and Co-Executing Agency, respectively.

Table 16: Gender Action Plan

Activities	Indicators	Means of Verification	Responsible Entity	Timeline
1. Include Elderly, women, children and differently-abled (EWCD) and gender inclusive features[5] in the EV policy framework; and in city e-mobility, charging infrastructure plan, and charging infrastructure network plan	(i) Elderly, women, children and differently-abled (EWCD) features are included in the policy framework and City e-mobility and charging infrastructure plan.	Project progress reports	PAU, TSU[6]	Year 1-4

Activities	Indicators	Means of Verification	Responsible Entity	Timeline
2. Build capacity of project staff on gender issues in the sector and practices for gender mainstreaming	(ii) Staff identified in EESL and NITI Aayog and designated as gender focal point to oversee implementation, monitoring and reporting of the gender action plan during project implementation. (Target: 1 Gender Focal Point in EESL and 1 Gender focal point in NitiAayog)Orientation provided to project staff on gender issues in energy sector; and practices for gender-mainstreaming (Target: 50 EESL staff including all women project staff)	Project progress reports	PAU, TSU	Year 1-4
3. Conduct orientation for project staff on gender-based violence and prevention of sexual harassment at workplace	(iii) Project staff oriented on gender-based violence and prevention of sexual harassment at workplace (Target: 50 staff from EESL and NitiAayog)	Project progress reports	TSU	Year 1-4
4. Build skills of women for employment opportunities in the sector	(iv) Train 200 women in relevant skills such as commercial drivers, service technicians, and in operations and maintenance work of EV fleets in select two cities	Project progress reports	TSU	Year 1-4
5. The IEC material and training modules developed for trainers and for conducting customer/end-user awareness and promotion campaigns include gender sensitive features and discourage gender stereotypes	(v) The IEC material developed for conducting customer awareness and promotion campaigns include gender sensitive features and discourage gender stereotypes	Project progress reports	TSU	Year 1-4

Activities	Indicators	Means of Verification	Responsible Entity	Timeline
6. Conduct awareness programs for potential customers and end-beneficiaries including workshops and events	(vi) Awareness programs for customers and end-beneficiaries conducted (Target: 500 persons with at least 40% women participation)	Project progress reports	PAU, TSU	Year 1-4
7. Strengthen gender inclusion in institution and Program Management	(vii) A gender specialist is mobilized for implementation of gender action plan.	Project progress reports	TSU	Year 1-4
8. Monitor and report on project gender action plan implementation	(viii) Sex-disaggregated project data collected and maintained including data on staff and participants in orientations/trainings. (ix) Progress on gender actions monitored regularly and reported in project progress reports.	Project progress reports	TSU	Year 1-4
Key Assumptions: <ul style="list-style-type: none"> - Executing Agency / Co-Executing Agency is committed to conducting the activities - Dedicated resources (human and financial) are allocated to implement component 1 to 4 - Gender Focal points designated to oversee implementation of gender actions during project implementation - Provision of gender specialist to guide the gender action plan 				

Expected Results:

1. A gender inclusive e-vehicle policy and framework developed
2. ECWD features integrated in the City e-mobility and charging infrastructure plan
3. Enhanced Capacities of the project staff enhanced on gender issues in the sector, and strategies and practices for gender mainstreaming
4. Awareness of the end-users especially women enhanced

5. Skills of women developed for potential employment opportunities in the E-mobility and allied sector
6. Gender inclusion in institution/project entities strengthened

[1] S. Torkington. 2016. India will have 7 megacities by 2030, says UN. *World Economic Forum*: 5 October; www.weforum.org/agenda/2016/10/indiamegacities-by-2030-united-nations/.

[2] Khosla, R (2009). *Addressing gender concerns in India's urban renewal mission*. UNDP: New Delhi. Available at <http://www.undp.org/content/dam/india/docs/addressinggenderconcerns.pdf>. Accessed on 21 March 2020.

[3] Asian Development Bank. 2013. *Gender Tool Kit ? Transport*. ADB: Manila.

[4] Modi, A., 'A quarter of scooter buyers are women', *Business Standard*, 25 July 2015, accessed on 6 September 2019 at https://www.business-standard.com/article/companies/a-quarter-of-scooter-buyers-are-women-115072500999_1.html

[5] EWCD features include (but not limited to) safety belts, alarms, child locks, elderly and differently-abled friendly seats and wheelchair friendly design features. Similarly, the charging infrastructure plan can include display boards with information on women specific schemes, women empowerment and helplines numbers within the charging station premises.

[6] PAU: Project Administration Unit housed at Executing Agency; TSU: Technical Support Unit housed at Co-Executing Agency

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

The private sector has played a huge role in India's development and economic growth over the last few decades. It fosters innovation, provides investments/funds, builds competitiveness, and creates employment in the industry/sector. In EVs also, the private companies in the country has been showing a lot of interest across the value chain viz. be it as an OEM (2W, 3W, 4W); Electric Vehicle Supply Equipment (EVSE) manufacturers; Energy Operators (providing battery charging and swapping stations) and Li-ion battery and recycling setup. This GEF project across various (below) Components will engage multiple private companies during project execution and unlock their potential for electric vehicles growth in India. Private sector stakeholders have been illustrated in the stakeholder section (section 2).

Component 1: Integrated EV policy and framework for the e-mobility transformation

The output under this component will develop favorable integrated policy for private sectors investment in e-mobility across its value chain (i.e. vehicle, chargers and its solutions, battery swapping solutions, etc.). As part of stakeholder consultations, Tata Power has been consulted to identify synergy on the project and specifically to support CEMP related activities under Component 1. Tata Power is an integrated power company and one of the leading distribution company in India. Their rich experience in data analysis, smart grid operations, integration of renewables into grid operations etc. will be useful in delivering project activities. Tata Power is amongst many private sector entities which have been consulted. These policies will benefit from close consultation with TP and other private players at the national level and in the 2 cities (which will be identified during this project execution).

Component 2: Environment and Resource Use Management Framework for Batteries

The output under this component will develop regulation and standards for manufacturing, use and disposal of batteries. It will also include policy development for Li-ion battery (LiB) reuse, recycling, retrofitting, etc. and its environmental and economic impact on different stakeholders. Attero, one of the leading private players in India actively promotes LiB reuse and recycling. The company has expressed strong support to this project and is a Co-financer under Component 2 activities. They have strategic investment plans of tentative USD 100 million in setting up advanced Lithium-ion battery (LiB) reuse and recycling plant(s) in next 3-5 years in the e-Mobility domain. Attero will support domain knowledge to the project implementation team through participation in relevant project activities. These types of similar companies could be engaged as a potential partner in the project during project implementation phase.

Component 3: Enabling scale up of e-vehicle markets through pilot demonstrations

The outputs under this component will see actual investments (from various stakeholders) in key e-mobility segments like 2-wheelers, 3-wheelers, cars, batteries, and charging infrastructure. In addition to investment support from EESL, a few other private players have expressed their strong support to this project. Tata Power is one such private corporation which has shown interest to support this project and some of their activities like development of charging infrastructure is synergistic to project objectives. Tata Power is credited with steering the energy sector on technology, process and platform and powering emerging technologies for the 'smart' customer, Tata Power is pioneer in leading Charging Infrastructure installations in the country with presence in over 60 cities in India. Tata Power may support through their expertise and domain knowledge of power distribution and charging infrastructure operations for the project activities under component 3. They have shown interest to support by providing their technical expertise for stakeholder consultations, make available their experts for joint meetings/ workshops and sharing any advance technical findings. During project inception, a more formal arrangement to engage Tata Power could be finalised.

Other private companies like Darwyn, recently launched its electric motorcycle called 'Theta' which is targeted towards hyperlocal delivery. On the other hand, Konvert Motors is 3W retrofitting company with LiB. Other private companies who can be engaged in the project can be from Aggregate Fleet Operators (Kinetic Green, Ather Energy, Okinawa, Goenka Electric Motor, Lohia Auto Ltd., etc.) and Energy Operators (Sun Mobility, Essel Green Mobility, etc.). These types of similar companies could be engaged as a potential partner in the project.

Component 4: Gender-sensitive capacity development and raising awareness for growing e-mobility

The outputs under this component will include capacity and awareness creation among government, consumers, etc. through material development (tools, good practices, etc.) for uptake of e-mobility. While many private players will take their products to the market, this awareness campaigns will enable supportive ecosystem at the local and national level (from users, DISCOMs, ULBs, etc.) and support in expediting deployments. This will also benefit the entire EV industry in creating right demand from the market. This component will also include skill assessment and development of training modules for Training of Trainers for strengthening EV services and improving EV financing.

Mechanisms to leverage private sector expertise is very important to improve the penetration of EVs. The involvement of private sector allows minimizing bottlenecks by pioneering in advanced technology, efficient operations and improved service delivery. Since electric mobility is still evolving, the sector requires collaborative industry action between all stakeholders. Tata Power, which has been consulted amongst many private entities, have shown interest to support on this project including activities under Component 4. Tata Power and other relevant private players could also be engaged as a potential partner on the project during project implementation phase.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Risk description	Main categories	Risk level rating	Risk Mitigation Strategy and Safeguards	By Whom / When?
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Risks arising due to COVID-19	Project Continuity	Moderate to High	<p>The project is expected to have inception workshop by November 2021, hopefully, by then, the pandemic would be under better control. The situation will be reviewed at the inception workshop and based on the situation the workplan will be revised and measures will be identified to mitigation the impacts. The key impact will be on holding meetings and travel which may slow down the implementation of project activities and demo projects.</p> <p>The economy is certainly curtailed due to pandemic but as things will improve, strong rebound in demand is expected due to increased individual usage of vehicles. Due to this, time scale will be delayed but not the actual investment.</p> <p></p> <p>The target setting for EVs at National and select city level (Output 1.1 and 1.2) will account for Covid impact on the industry. Indian automotive industry has shown rebound with higher post-Covid sales in 2Ws and passenger car segments.</p> <p></p> <p>The impact of green recovery from EVs including on employment will be studied and appropriately interventions recommended under policy design output 1.1</p>	PAU/TSU
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<p>Negative perceptions about e-mobility technology and the impacts this will bring to society and industry</p>	<p>Political</p>	<p>Moderate</p>	<p>The proposed project plan includes collaborative discussion/ workshops with key stakeholders (including Govt., Public & Private Sectors, OEMs, Service Providers, Institutes, etc.) and the communication/ advocacy activities that will reduce this risk in two main ways: first, integrating the views of stakeholders into the planning process; second, providing more in-depth explanations of the actual impacts of the measures to be taken. These activities typically reduce the level of negative perceptions in the project.</p>	<p>PAU/TSU through all the project output</p>
<p>Materials developed are not relevant for country context</p>	<p>Technical</p>	<p>Low</p>	<p>The proposed project will include development of materials around capacity building activities; public awareness and advocacy; development of applications, tools, websites, etc. and stakeholder consultations & engagement across various outputs. Another important aspect considered in the project is to provide trainings to EV supply side ecosystem. These are detailed in ?Knowledge Management? section and would be very useful for stakeholders.</p>	<p>PAU/TSU</p>

<p>Countries are not interested in second life and disposal of batteries so early on in market</p> <p>transformation to electric vehicles/ Materials from EVs (e.g. from batteries) might generate environmental pollution</p>	<p>Political/ Environmental</p>	<p>Moderate/ Substantial</p>	<p>In India, there is already awareness around the safe disposal, recycling and reusability of batteries. The increasing volume of mobile phone and computers batteries for disposal has highlighted the urgency for addressing this issue. MoEFCC recently drafted a policy that has mandated safe disposal of LIBs through Extended Producer Responsibility (EPR). The Component 2 will focus and facilitate Govt. in developing appropriate regulation and standards for effective operationalization of LIB reuse and recycling policy.</p> <p>Increasing market for electricity storage provides a market for used batteries from vehicles. Enabling regulations and clarity of rules will help expand the market and create a market for second use. The project activity addresses this under component 2.</p>	<p>PAU/TSU, MoEFCC</p>
<p>The growing demand from electric vehicles in a country can destabilize the power supply</p>	<p>Technical/ Economic</p>	<p>Low/Moderate</p>	<p>As per Power Ministry report, the installed power generation capacity of India is large enough (344.7 GW as on 31 August 2018) to cater to the demand generated by electric vehicles. In fact, the average plant load factor of the country was only 60.67% in 2017-18, which means about 40.3% of the capacity was unutilized. The peak load coming from EV charging may not pose a significant toll on the existing business-as-usual infrastructure upgradation plan. The load factor from EV charging is similar (closely matches) to DISCOM's any other loads and hence can be planned on an as-is basis rather than a drastic change or investments. With clear and evolving policies on EV adoption trends, DISCOM can undertake the required local distribution transformer level interventions and splitting of feeders to take more loads.</p>	<p>PAU/TSU</p>

Leadership change: change in leadership and priorities in the government	Political/ Institutional	Low/Moderate	<p>The efforts today in the country has established the buy-in by a wide range of stakeholders specially in the private sector. The political take up is not just at central level but also at all the major states in the country. The global development and push on e-mobility too is providing the necessary push. The e-mobility transformation will occur irrespective of the project but will be at a lower phase. The proposed component/outcomes/outputs are developed to address the key environmental and transport challenge perceived by a range of stakeholders. The component on integrated EV policy and framework in existing national strategies ensure continuity of policy across political regime. Further, component 4 will include institutional capacity building and awareness across stakeholders (Govt. at Central, State and City levels; Private Players, etc.). Further, PMU will ensure that key activities are completed and demonstrated, which is key to buy in, are finalized before next elections.</p> <p>Further, the political situation is stable and next national elections are due in May 2024, by when the majority of project activities will be well advanced.</p>	PAU/TSU
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GHG savings achieved are limited in countries with a more carbon-intensive grid	Environmental	Low/Moderate	Government of India has set a target of installing 175 GW of renewable energy capacity by the year 2022, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydropower. This is expected to reduce the grid emission factor of India significantly. The GoI has announced a target 450 GW by 2030. So, with the integration of renewable energy it is expected that considerable GHG emission reduction can be achieved. The decreasing cost of RE as all countries expand capacities will result in high likelihood of this target.	
Higher upfront cost of electric vehicles may pose a barrier to implementation and scale up of activities	Economic	Moderate	Initial Govt. capital subsidies and exemptions/ tax benefits for EVs has driven some momentum for EV adoption in the country. Through the GEF grant, this project is likely to establish viable business models, which could further accelerate the adoption of electric vehicles, removing the initial barrier to implementation.	PAU/TSU
Objection or low commitment from industry to technology changes	Political/ Economic	Low	Indian Ministries and various public & private sector companies are working across EV value chain. These players from industries are involved in manufacturing vehicles and components, charging infra setup, retrofitting, battery swapping solutions, etc. This GEF project is expected to further give stimulus to the industry partners/ players in the country and their more integrated role in EVs in India.	PAU/TSU

Insufficient and incomparable systems for tracking results	Capacity/ Technical	Low/ Moderate	<p>As part of Knowledge Management plans, the proposed project will include development of applications, tools and websites as below:</p> <p>i) "Zero Emission Vehicles (ZEV) City Connect" for digitalization and hosting of cities e-mobility data, periodic updates of ZEV deployment at city levels, assessment of GHG reduction and AQI Impact from EVs</p> <p>ii) End-user centric Portal "ZEV People Connect" and integrate with National ZEV Platform with tools and regular content to educate masses around low carbon transportation choices and facilitating decision making to switch to EVs</p> <p>iii) "ZEV National Connect" to bring together Central and State EV Nodal Agencies and Industries for best practices exchange</p> <p>iv) "ZEV City Connect" to drive coordination and support for EV growth from important stakeholders (EV Fleet Operators, Charging Providers, DISCOM, ULB and others)</p> <p>Above tools will help in institutional capacity development at all levels (Central, State and City) and improve alignment and coordination across stakeholders.</p>	PAU/TSU
Time lag of results: Major results of the project may not be seen before the end of the project period	Political	Low	<p>A survey is planned and budgeted towards the end of this project, which can give an indication of the kind of expected results. Secondly, in the alternative section, it is explained, that this project will not only have benefits on the GHG reduction front but on triggering the other projects aimed for GHG reduction and improvement in air quality.</p>	PAU/TSU

Lack of interest or participation from market players/ private sector	Economic	Low/ Moderate	<p>The private companies in India has been showing a lot of interest across the EV value chain viz. be it as an OEM (2W, 3W, 4W); Electric Vehicle Supply Equipment (EVSE) manufacturers; Energy Operators (providing battery charging and swapping stations) and Li-ion battery and recycling setup.</p> <p>This was discussed and understood during the stakeholder consultations as well. The involved entities are very much keen to take this up, considering the larger benefits to the country. Also, the industry is very much aware of the impact of climate change and GHG emissions and is keen to incorporate changes.</p>	PAU/TSU, Private Players,
<p>Lack of linkages with available</p> <p>funding/ financing for EVs fleets</p>	Financial	Moderate	<p>This project will explore the possibilities of mixing and matching the existing available funding/financing for EVs fleets. Some examples are co-financing coming from EESL and few private players in different outputs. Through this GEF finance, those initial apprehensions/ barriers can be removed.</p>	PAU/TSU, EESL, Private Players

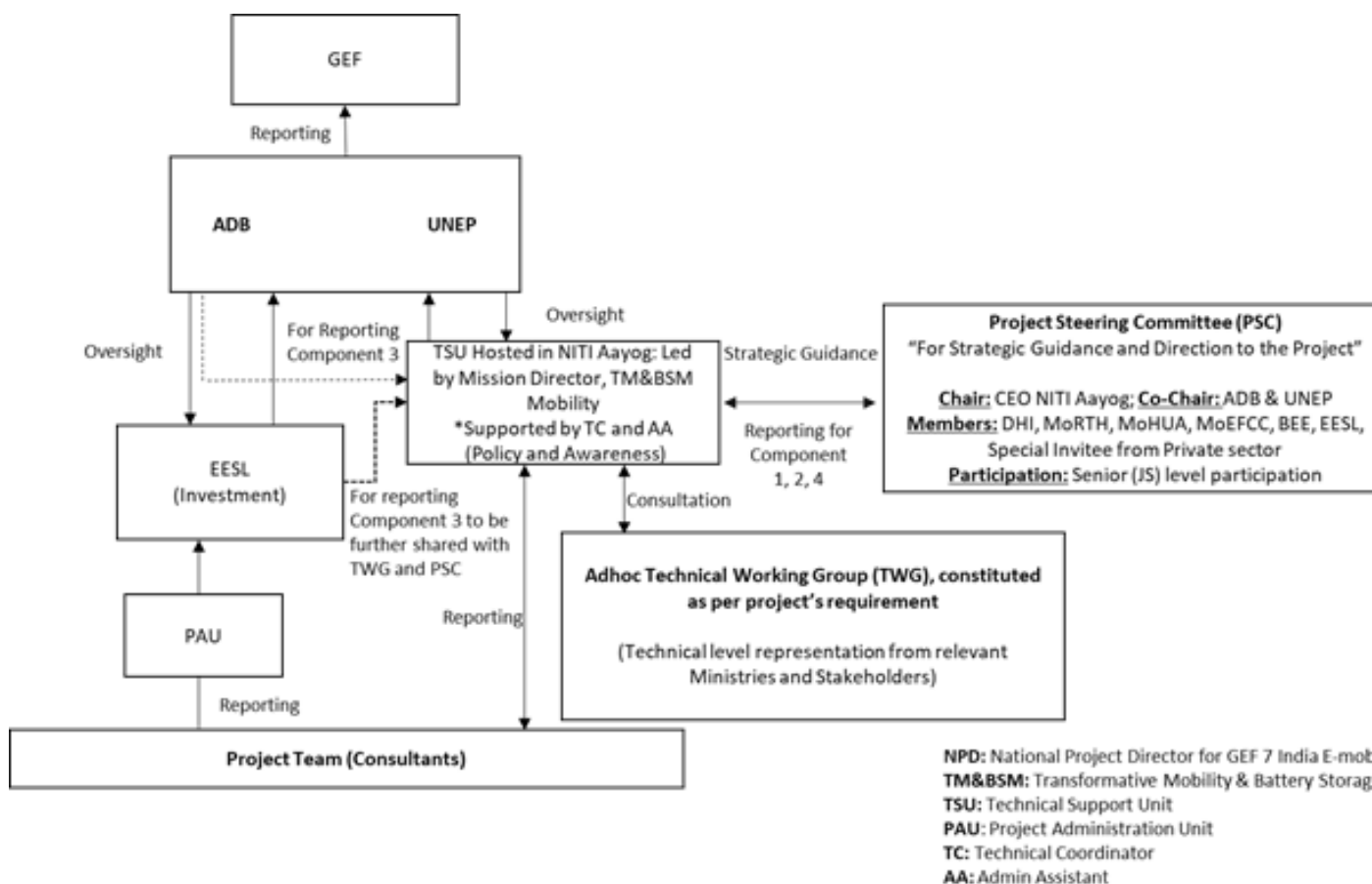
Inadequacy of the exit strategy and lack of ownership of the program after the end of the GEF funded activities and inability to source resources to continue the program's activities in the medium/long term (including thematic working groups and support and investment platforms)	Political/ Financial	Low/ Medium	The project activities and outputs are aligned with the Mandate of the Govt. of India as well as based on the key issue of air pollution and traffic congestion perceived as key issue with wide range of stakeholders. Further, the deliverables will be developed and integrated into the policy/regulatory framework of the key Ministries with related mandate.	PAU/TSU
Higher electricity use might lead to higher emissions, e.g. from coal power plants	Environmental	Low	There is a strong commitment of the GoI to expanding use of renewable energy (RE). The 2022 target of 175 GW is now scaled up to 450 GW by 2030. This though aspirational provides a clear direction to the market. Thus, it is more likely than not that higher share of future electricity will be from RE.	PAU/TSU
Change of leadership at EESL	Political	Medium	The project team will ensure continuous update of the project strategy with the new leadership and try to align the updated thoughts with the project objectives.	PAU/TSU

ADB and UNEP have supported an environment and social safeguards (ESS) assessment for the proposed project. The project will adhere to the minimum requirements of UNEP, ADB and GEF set policies and measures for ESS. For detailed stance and risk categories and ratings, Annex P may be referred.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

The executing arrangement for the India project would be as follows:



This project is funded by the GEF Trust Fund. Asian Development Bank (ADB) and UN Environment Program (UNEP) are the GEF Implementing Agencies (IAs). ADB is the lead agency and will be primarily responsible for reporting, monitoring and evaluation and relationship management with GEF. ADB is providing loan to EESL for investment in scaling up demand side energy efficiency, which includes e-vehicles and associated charging infrastructure. ADB brings its knowledge and expertise to bear on the investment related activities of the project encapsulated in component 3. UNEP, as the lead of Global Project on E-mobility Transformation along with International Energy Agency, with its expertise in policies, regulations and capacity buildings will take lead on the policy components, viz., components 1, 3 and 4. The IAs, will keep an regular oversight on project execution and conduct project supervisory missions as per Supervision Plans and in doing so ensures that all ADB, UNEP and GEF criteria, rules and

regulations are adhered to by project partners. They will also technically assess and oversee quality of project outputs, products and deliverables ? including formal publications. The IAs will also ensure linkage to any events organized by GEF, ADB and UN Environment to disseminate information on project results and lessons.

NITI Aayog as the lead coordinating agency on Transformative Mobility & Battery Storage Mission (TM&BSM) will lead the coordination of efforts with Government entities and other key stakeholders for delivering the project outputs. This will ensure complementarity of project efforts to the efforts of Government of India. The Mission Director, TM&BSM, NITI Aayog will serve Lead the day to day implementation of the project and head the Technical Support Unit established at the NITI Aayog. NITI Aayog with support from EESL will ensure technical execution according to the execution plan laid out in the project document; ensure technical quality of products, outputs and deliverables; monitor and evaluate the project outputs and outcomes; ensure proper coordination among all project stakeholders, in particular government entities; and ensure timely submission of all project reports, including work plans and financial reports.

EESL, as one of the key agencies for stimulating the e-mobility investments in India will be the lead executing entity for the investment component of the project. EESL will appoint a senior staff to supervise the component 3 work and project specialist supported through GEF funds for executing the work of component 3 located at EESL. NITI Aayog will provide synergistic support to EESL with the policy components and be involved in the execution of relevant technical and market related work under Component, Output 3.1. EESL will also manage the project funds and would support the procurement of goods and services (including for procurement plans provided by TSU) and will be guided by ADB procurement policies (as amended from time to time).

The project will invite private sector representatives to PSC. The project has consulted many private sector entities during stakeholder consultations and workshops. Tata Power and Attero are prime candidate to join as special invitee to PSC given their interest to support project activities and their synergy with the project objectives and deliverables. However, this arrangement will be formalized during project implementation and other representative of private sector could also be involved.

A Technical Support Unit (TSU) will be established in NITI Aayog to support it in undertaking its functions as the lead entity for the project and headed by the Mission Director, TM&BSM under the general supervision of the CEO NITI Aayog. The TSU will be supported by the GEF project, primarily costs of technical specialists, and may also benefit from additional support from ADB, as deemed necessary. NITI Aayog will provide in kind support to provide for office facility and related services for the TSU. The TSU lead will be supervised by NPD. TSU lead will be responsible for day to day operations

of the project and reporting to the UNEP and ADB on the project progress on a regular basis including the financial reporting. TSU lead will ensure compilation and submission of progress, financial and audit reporting to IA; submit budget revisions to IA for approval; address and propose solutions to any problem or inconsistency raised by the IA; bring issues raised by or associated with clients to the IA for resolution; facilitate meetings of Steering Committees and other oversight bodies of the project.

A Project Administration Unit (PAU) supported by project management funds of GEF project will be established at EESL to support the management of the project funds. The Unit will be responsible for undertaking the procurements for the project and maintenance of all Financial Accounts. The procurement will be undertaken on behalf of TSU for components 1, 2 and 4. The PAU will be led by senior staff in charge of the GEF project based at EESL.

An Executive Committee (EC) constituting of Task Manager UNEP, ADB representative, head of TSU and Senior staff of EESL overseeing the work of PAU. The EC will meet every quarter and be responsible for finalizing annual workplan, review execution challenges and identify solutions, ensure timely and quality implementation of project.

CEO, NITI Aayog will Chair the Project Steering Committee and will be part of the Steering Committee of the TM&BSM. The PSC will have nominated members from Key Ministries (DHI, MoRTH, MoHUA, MoEFCC, BEE, EESL, and Ministry of Women and Child Development[1] at Senior management level and invited members from non-government stakeholders (Representative of Private sector [2]and Civil Society). ADB and UNEP will also be represented on the PSC, with option for a GEF representative on ?as needed? basis, with observer status. The role of the PSC is to provide oversight of the project progress and implementation of outputs; facilitate cooperation with key government stakeholders of the project and ensuring synergies with Government initiatives; and, provides overall guidance and strategic direction. PSC will ensure all the existing and planned initiatives/projects by the participating stakeholders are in alignment with each other and there is no duplication of efforts and resources. The PSC will meet twice a year and consider the progress of the project and provide guidance.

The project will consider forming a ?Development Partner Group? (DPG) with observer status on the PSC. This DPG would consist of private foundations/ multilateral development banks/ bilateral donors including World Bank, ADB, KfW, UNEP, DFID, etc. The aim will be to help the Government of India, through the Electric Mobility Mission, to coordinate investments and activities at national and sub-national levels within the e-mobility ecosystem. This would help synergize investments, avoid duplication of efforts, and promote operational efficiency to the extent possible.

An Adhoc Technical Working Group (TWG), constituted as per project's requirement, with department level representatives from the relevant ministries and agencies, including representatives from private sector and civil society organization, specially working on gender issues. The TWG will be consulting the TSU Hosted in NITI Aayog: Led by Mission Director, TM&BSM Mobility and provide technical feedback to support the completion of project activities; provide linkages with other on-going works of parent departments to ensure synergies; and participates in consultation meetings and training programs as well as provide data and information required for executing the activities. It will meet on a quarterly basis. TSU will support the meetings of TWG.

Additionally, the proposed technical support unit and project administration unit will be responsible to coordinate with the key stakeholders (the same set mentioned above) on output basis, which will ensure seamless coordination and progress towards achievement of the project objectives. For e.g. the technical support unit will ensure the implementation and delivery of proposed activities/deliverables as part of Component 2 through the Ministry of Environment, Forest and Climate Change in India, and will also ensure this component outputs are aligned with the other ongoing/planned efforts from the Ministry side. On similar lines, PAU and TSU will engage with each of the relevant stakeholders on an ongoing basis. The project manager will be tasked to coordinate with other relevant GEF-financed projects and other active bilateral/multilateral initiatives to support e-mobility in India during implementation stage.

The main project bodies are the following (refer to Annex K for more details):

Body	Composition	Role and description	Frequency of meetings
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Body	Composition	Role and description	Frequency of meetings
Project Steering Committee (PSC)	<p>? ADB Task Manager</p> <p>? UNEP Task Manager</p> <p>? Representation from GEF Focal Point</p> <p>? Senior Representatives from NITI Aayog, DHI, MoRTH, MoHUA, MoEFCC, BEE, EESL</p> <p>? Other Special Invitees from Civil Society and Private Sector[3]</p> <p>? Representation from the TM&BSM</p> <p>? Representation of members from the Industrial Associations</p> <p>? Special invitees from ?Development Partners Group?</p>	<p>? Provides oversight of the project progress and implementation of outputs</p> <p>? Approves annual work plans and budget</p> <p>? Approves management decisions to ensure timely delivery of quality outputs</p> <p>? Provides overall guidance and strategic direction;</p> <p>? Work in tandem with the TM&BSM</p> <p>? Coordinate with other donors / multilateral/bilateral agencies supporting e-mobility development in India</p>	Twice a year

Body	Composition	Role and description	Frequency of meetings
Adhoc Technical Working Group (TWG)	<p>Adhoc Technical Working Group will be constituted for the main elements of work with department level representatives from the relevant ministries and agencies as needed, including:</p> <ul style="list-style-type: none"> ? NITI Aayog ? Department of Heavy Industry ? Ministry of Road Transport and Highways ? Ministry of Housing and Urban Affairs ? Ministry of Environment, Forest and Climate Change ? Ministry of Women and Child Development ? Bureau of Energy Efficiency ? Energy Efficiency Services Limited ? Special invitee from private sector and manufacturers in 2W, 3W and 4W 	<ul style="list-style-type: none"> ? Provides technical inputs to support the completion of project activities. ? Provides linkages with other on-going works of parent departments to ensure synergies. ? Participates in consultation meetings and training programs as well as provide data and information required for executing the activities. 	On need basis to consider and provide inputs for Output finalization.

Body	Composition	Role and description	Frequency of meetings
Implementing GEF Agency (IA)	Asian Development Bank, UN Environment Programme	<p>? Ensure timely disbursement/sub-allotment to executing/co-executing agency based on agreed legal document and in accordance with ADB, UNEP and GEF fiduciary standards</p> <p>? Follow-up with Executing/Co-Executing agency for progress, equipment, financial and audit reports</p> <p>? Provide consistent and regular oversight on project execution and conduct project supervisory missions as per Supervision Plans and in doing so ensures that all ADB, UNEP and GEF criteria, rules and regulations are adhered to by project partners</p> <p>? Technically assess and oversee quality of project outputs, products and deliverables ? including formal publications.</p> <p>? Provide no-objection to main TORs and subcontracts issued by the project, including selection of the Project Manager (PAU) and Sr. Technical Coordinator (TSU)</p> <p>? Attend and facilitate inception workshops, field visits where relevant, and selected steering committee meetings</p> <p>? Asses project risks, and monitor and enforce a risk management plan</p> <p>? Regularly monitor project progress and performance and rate progress towards meeting project objectives, project execution progress, quality of project monitoring and evaluation, and risk</p> <p>? Monitor reporting by project executing partners and provide prompt feedback on the contents of the report</p> <p>? Promptly inform the management of any significant risks or project problems and act and follow up on decisions made</p> <p>? Apply adaptive management principles to the supervision of the project</p> <p>? Review of reporting, checking for consistency between execution activities and expenditures, ensuring that it respects GEF rules</p> <p>? Clear cash requests, and authorization of disbursements once reporting found to be complete</p> <p>? Approve budget revision, certify fund</p>	Periodic meetings (calls) with the Project Administration Unit and Technical Support Unit, at least once in two months

Body	Composition	Role and description	Frequency of meetings
Executing Agency (EA)	EESL (Component 3)	<ul style="list-style-type: none"> ? Ensure that the project meets its objectives and achieves expected outcomes 	Periodic meetings (calls) with the ADB/UNEP Task Manager, at least once in two months
Co-Executing Agency (cEA)	NITI Aayog (Component 1, Component 2, Component 4)	<ul style="list-style-type: none"> ? Ensure technical execution according to the execution plan laid out in the project document ? Ensure technical quality of products, outputs and deliverables ? Ensure compilation and submission of progress, financial and audit reporting to IA ? Submit budget revisions to IA for approval ? Address and propose solutions to any problem or inconsistency raised by the IA ? Bring issues raised by or associated with clients to the IA for resolution ? Facilitate meetings of Steering Committees and other oversight bodies of the project ? Day to day oversight of project execution ? Submit all technical reports and completion reports to IA (realized outputs, inventories, verification of co-finance, terminal reporting, etc.) ? Monitoring and evaluation of the project outputs and outcomes ? Effective use of both international and national resources ? Timely availability of financing to support project execution ? Proper coordination among all project stakeholders; in particular, national parties ? Timely submission of all project reports, including work plans and financial reports, ? Follow-up with, or progress, procurement, financial and audit reports. 	

Body	Composition	Role and description	Frequency of meetings
Project Administration Unit (PAU)	<ul style="list-style-type: none"> ? Project Manager (housed at EA) ? Admin Assistant (housed at EA) ? Procurement & Finance Assistant (funded by UNEP; housed at EA) 	<ul style="list-style-type: none"> ? Reporting to ADB & UNEP for C3 & PIR inputs to ADB for C3 ? Procurement for the whole project basis ToRs for respective components ? Maintenance of all Financial Accounts ? Financial Reporting for C3 ? Admin support for Component 3 related activities 	-
Technical Support Unit (TSU)	<ul style="list-style-type: none"> ? Sr. Technical Coordinator (housed at cEA) ? Technical Coordinator (housed at cEA) ? Admin Assistant (housed at cEA) 	<ul style="list-style-type: none"> ? Reporting to UNEP & ADB for C1, C2 and C4 ? Half-yearly reporting (internal to UNEP) ? PIR inputs to UNE for Component 1, 2, 4 for forwarding to ADB ? Admin Support for Component 1, 2, 4 ? Financial Reporting for C1, C2 and C4 to UNEP 	-
Technical Support Unit (TSU)	National Project Director (NPD)	<ul style="list-style-type: none"> ? Will be a national/governmental officer appointed by the Co-Executing Agency (NITI Aayog) ? Act as the PSC's Chairperson ? Report to and receive advice from the PSC ? Identify and secure partner support for the implementation of project activities ? Advise on hiring process. ? Act as the project's entry point within the Government of India 	Regular meetings with the Sr. Technical Coordinator and Project Manager, at least twice per month

Body	Composition	Role and description	Frequency of meetings
Project Administration Unit (PAU)	Project Manager (PM)	<p>The PM will be recruited externally, supported with GEF funds, hosted within Energy Efficiency Services Limited premises and have the following duties, for Component 3:</p> <ul style="list-style-type: none"> ? Take responsibility for day-to-day project operations ? Take responsibility for the execution of the project in accordance with the project objectives, activities and budget ? Deliver the outputs and demonstrate its best efforts in achieving the project outcomes ? Coordinate project execution and liaison with national counterparts (Niti Aayog, relevant ministries, national agencies, private sector, NGOs etc.) ? Manage financial resources and processing all financial transaction relating to sub-allotments ? Prepare all annual/year-end project revisions ? Attend and facilitate inception workshops and national project steering committee meetings ? Assess project risks in the field, monitor risk management plan ? Ensure technical quality of products, outputs and deliverables ? Coordinate the project team of consultants and subcontractors ? Coordinate with strategic taskforces (i.e. thematic or technical working groups) ? Periodic reporting to ADB for allocation of the GEF grant according to the approved workplan and budget, in coordination with ADB and NPD ? Notify ADB in writing if there is need for modification to the agreed implementation plan and budget, and to seek approval ? Address and rectify any issues or inconsistencies raised by the Implementing Agency ? Support compilation and submission of progress, financial and audit reporting to the Implementing Agency ? Prepare, at the end of the project, the project Final Report. 	<p>Regular meetings with the NPD, at least twice per month</p> <p>Quarterly meeting with the project's Financial Officer</p> <p>Ad-hoc meetings with project team members (consultants, subcontractors, etc.)</p>

Body	Composition	Role and description	Frequency of meetings
Technical Support Unit (TSU)	Sr. Technical Coordinator	<p>The Sr. Technical Coordinator will be recruited externally, paid with GEF funds, hosted within NITI Aayog premises and have the following duties, for <u>Component 1, Component 2 and Component 4:</u></p> <ul style="list-style-type: none"> ? Take responsibility for day-to-day project operations ? Take responsibility for the execution of the project in accordance with the project objectives, activities and budget ? Deliver the outputs and demonstrate its best efforts in achieving the project outcomes ? Coordinate project execution and liaison with national counterparts (relevant ministries, national agencies, private sector, NGOs etc.) ? Manage financial resources and processing all financial transaction relating to sub-allotments ? Prepare all annual/year-end project revisions ? Attend and facilitate inception workshops and national project steering committee meetings ? Assess project risks in the field, monitor risk management plan ? Ensure technical quality of products, outputs and deliverables ? Coordinate the project team of consultants and subcontractors ? Coordinate with strategic taskforces (i.e. thematic or technical working groups) ? Plan and organize the PSC annual meetings ? Periodic reporting to UN Environment and the PSC for allocation of the GEF grant according to the approved workplan and budget, in coordination with UN Environment and NPD ? Act as Secretary of the PSC ? Notify UN Environment and the PSC in writing if there is need for modification to the agreed implementation plan and budget, and to seek approval ? Address and rectify any issues or inconsistencies raised by the Implementing Agency 	<p>Regular meetings with the NPD, at least twice per month</p> <p>Quarterly meeting with the project's Financial Officer</p> <p>Ad-hoc meetings with project team members (consultants, subcontractors, etc.)</p>

Through the Project Administration Unit (PAU) and Technical Support Unit (TSU), housed at Executing Agency and Co-Executing Agency, the project will ensure participation in the global project.

? Coordination with other initiatives:

The proposed Project Steering Committee, chaired by the National Project Director from Co-Executing Agency (NITI Aayog) will ensure coordination with the key stakeholders in the Electric Vehicle Landscape in India i.e. Department of Heavy Industry, Ministry of Power, Bureau of Energy Efficiency, Ministry of Environment, Forest and Climate Change, Ministry of Road Transport and Highways, to name a few. PSC will ensure all the existing and planned initiatives/projects by the participating stakeholders are in alignment with each other and there is no duplication of efforts and resources. One such key project is World Bank supported Program for Transformative Mobility and Battery Storage?. Niti Aayog which is a co-executing agency on this GEF project is also a key stakeholder in the World Bank supported initiative. As mentioned earlier, this GEF project will look to synergies efforts and coordinate activities (through PSC) for avoiding duplication of efforts by various multilateral agencies. The key objectives of this World Bank supported project (total financing of around \$ 1070 million) is to support concessional financing for battery storage and charging infrastructure will be made available to the battery energy storage and charging infrastructure markets through a commercial bank. A significant grant-funded technical assistance program will support necessary analytical work, capacity and institutional development, market development, policy and regulatory development and awareness raising.

On an operational level, the proposed technical working group will have department level representatives from the above-mentioned stakeholders. This working group will ensure all the operational level aspects are very well aligned, to ensure the outputs prepared under project are synergistic with the Ministry mandates and enable ownership.

Additionally, the proposed technical support unit and project administration unit will be responsible to coordinate with the key stakeholders (the same set mentioned above) on output basis, which will ensure seamless coordination and progress towards achievement of the project objectives. For e.g. the technical support unit will ensure the implementation and delivery of proposed activities/deliverables as part of Component 2 through the Ministry of Environment, Forest and Climate Change in India, and will also ensure this component outputs are aligned with the other ongoing/planned efforts from the Ministry side. On similar lines, PAU and TSU will engage with each of the relevant stakeholders on an ongoing basis.

[1] Interaction with Ministry of women and child development would be (limited to) inviting them in stakeholder consultations during policy framework preparation and sharing of draft Policy framework for their comments.

[3] During project implementation phase, special invitees from private sector will be identified who could be invited to PSC. Tata Power and Attero are the likely private sector representative to the PSC. The project may invite additional invitees from private sector to PSC.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The project is directly supportive of, and consistent with, India's national priorities and policies related to climate change and e-mobility. Specifically, it is consistent with the Nationally Determined Contributions (NDCs), National Clean Air Program (NCAP), Sustainable Development Goals (SDGs) and National Mission on Electric Mobility.

Nationally Determined Contributions (NDCs) under UNFCCC: Reducing emissions from transportation sector is clearly stated as one of the priority areas in India's NDCs, and the country has already started taken steps to achieve lower emission intensity in the automobile and transport sector. Out of the 8 strategic priorities of India's mitigation strategy outlined in the NDC, one is fully focused on the promotion of 'safe, smart and sustainable green transportation networks'. India has agreed to reduce its GHG intensity by 33-35% by 2030, using 2005 levels as baseline.

National Clean Air Program (NCAP): The NCAP is a medium-term national level strategy to tackle the increasing air pollution problem across India in a comprehensive manner. The overall objective is to augment and evolve effective ambient air quality monitoring network across the country besides ensuring a comprehensive management plan for prevention, control and abatement of air pollution. One of the approaches 'Impetus on Vehicular Pollution', outlines Bharat Stage Emission Standards (BSES) that regulate output of air pollutants from ICE engines and measures that emphasize cleaner/alternate fuels and vehicles. NCAP also has a measure focusing on revision of rules on e-waste. The NCAP focuses on collaborative and participatory approach covering all source of pollution and coordination between relevant Central Ministries, State Governments, local bodies and other stakeholders. The NCAP also identifies

cities all over India, called 'non-attainment cities' where due to the levels of particular air pollutants, interventions will be prioritized.

Sustainable Development Goals (SDGs): Above all, the project is directly aligned with India's SDG Goal 13 'Take urgent action to combat climate change and its impacts'. Nonetheless, to a certain extent it is also consistent with Goal 7 'Ensure access to affordable, reliable, sustainable and modern energy for all' (since the project will promote the development of charging stations powered with renewable energy sources), Goal 9 'Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialization and Foster Innovation' (which has a special focus on the transportation sector in the context of India), Goal 11 'Make cities and human settlements inclusive, safe, resilient and sustainable', Goal 12 'Ensure sustainable consumption and production patterns' and Goal 5 'Achieve gender equality and empower all women and girls'.

National Mission on Electric Mobility: The Mission's objective is to promote quicker adoption and manufacturing of hybrid and electric vehicles in the country, which was approved by the Government of India in 2011. Two years later, the National Electric Mobility Mission Plan 2020 (NEMMP 2020) was unveiled. As part of the Mission, the Department of Heavy Industry has developed a scheme named FAME India (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in India). The scheme is planned to be implemented over a period of 6 years (until 2020), with the objective of supporting the hybrid/electric vehicles market development and its manufacturing ecosystem to achieve self-sustenance at the end of the stipulated period. This scheme is aimed at incentivizing all vehicle segments: i.e. 2-wheelers, 3-wheeler auto, passenger 4-wheeler vehicles, light commercial vehicles and buses. FAME India aims at a cumulative fuel saving of about 9.5 billion liters equivalent, resulting in reduction of pollution and greenhouse gas emissions by two million tons, with targeted market penetration of 6-7 million vehicles per year by 2020. The Mission is planned to be one of the biggest contributors in reducing pollution from road transport sector in the near future.

Renewable Energy Targets: Government of India has set a target of installing 175 GW of renewable energy capacity by the year 2022, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydropower. This target aligns with India's Intended Nationally Determined Contribution (INDC) which aims to base 40% of the total installed power generation capacity on non-fossil fuel resources by 2030 with international support on technology transfer and financing. The Government in its policy statement to the Parliament, in January 2020, announced a target of 450 GW of renewable energy by 2030.

United Nations Development Action Framework (UNDAF): India's United Nations Development Action Framework for 2018-2022 has not been issued yet. However, the country's UNDAF 2013-2018

defines its 6th outcome as "Government, industry and other relevant stakeholders actively promote more environmentally sustainable development and resilience of communities is enhanced in the face of challenges of climate change, disaster risk and natural resource depletion", to which the project can directly contribute. In addition, since the project will be giving special attention to gender equality mainstreaming it is also aligned with the 3rd UNDAF outcome: "Government and civil society institutions are responsive and accountable for improving women's position, advancing their social, political, economic rights and preventing gender discrimination".

Smart Cities Mission: Launched in 2015, under the Ministry of Housing and Urban Affairs (MOHUA), the Mission's objective is to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of "smart" solutions. Some core infrastructure elements would include assured electricity supply, efficiency urban mobility and public transport, sustainable environment etc. A total investment of 28,854.4 Million (Rs. 201,981 crores) have been proposed by the 99 cities under their smart city plans, where about 80% are focused on revamping an identified area (area-based projects) and the remaining 20% are for smart initiatives across the city (pan city initiatives). The mission also includes setting up of special purpose vehicles at city levels and detailed action plans for implementation.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

The project is part of the global GEF-UNEP Program on Electric Vehicles. It will actively participate in the program's global and regional activities through its component 1, for example by participating and contributing to the knowledge exchange in the regional knowledge and investment platforms and the relevant global working groups, as well as by providing insights and knowledge.

Knowledge Management (KM) is a vital factor for the project, both at the national level as well as at the global program level. It strengthens the ability to learn from existing experience and to make this knowledge readily available to wider stakeholders. As part of KM plans, the proposed project will include capacity building activities; public awareness and advocacy; development of applications, tools, websites, etc. and stakeholder consultations & engagement across various outputs.

The project will see development of following applications and tools:

- i. **"Zero Emission Vehicles (ZEV) City Connect"** for digitalization and hosting of cities e-mobility data, periodic updates of ZEV deployment at city levels, assessment of GHG reduction and AQI Impact from EVs
- ii. **End-user centric Portal "ZEV People Connect"** and integrate with National ZEV Platform with tools and regular content to educate masses around low carbon transportation choices and facilitating decision making to switch to EVs

- iii. **"ZEV National Connect"** to bring together Central and State EV Nodal Agencies and Industries for best practices exchange
- iv. **"ZEV City Connect"** to drive coordination and support for EV growth from important stakeholders (EV Fleet Operators, Charging Providers, DISCOM, ULB and others)

Above tools will help in institutional capacity development at all levels (Central, State and City) and improve alignment and coordination across stakeholders.

The project also includes public awareness and advocacy programs to assess end-user's knowhow around EVs, their challenges, its techno-economics, their purchase and usage decisions, willingness to adopt EVs, etc. Basis to this, promotion campaigns/ materials will be designed for capacity building of users to drive EVs adoption (at individual and aggregate levels). These campaigns will incorporate Gender sensitive best practices in design, material development and execution. Another important aspect of KM considered in the project is to provide trainings to EV supply side ecosystem. This will include skill assessment for drivers, maintenance technicians (across vehicle segments), financing institutions, etc. and their respective development of training modules.

Furthermore, this project will receive knowledge in the form of trainings, best practices and tools provided by the Global electric mobility program. On the other hand, overall lessons from the proposed project will be of substantial value to the Global electric mobility program which will disseminate the lessons of India through its regional hubs, which link the global program activities to the child projects. Additionally, linkages with the Global Platform for Sustainable Cities will help in leverages the best practices being implemented in five Indian cities. Linkages to the Global electric mobility program will provide countries a unique opportunity to exchange on-the ground experiences with electric mobility South to South, North to South and Peer to Peer.

The focus on creating a useful KM is a good way to ensure that project learnings are shared nationally and across the borders.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

Monitoring and Evaluation (M&E) activities and related costs are presented in the costed M&E Plan (Annex J) and are fully integrated in the overall project budget.

The project is Co-Implemented by ADB and UNEP with ADB the lead agency responsible for reporting to the GEF. UNEP will work closely with ADB in monitoring, reporting and evaluation of the project. The project will comply with ADB and UNEP standard monitoring, reporting and evaluation procedures for their respective responsibilities. It will also be consistent with GEF Policy on Monitoring, and the GEF

IEO Evaluation Policy. Reporting requirements and templates are an integral part of the legal instrument to be signed by the Executing Agency, Co-Executing Agency and the GEF Implementing Agencies.

The Project Results Framework presented in Annex A includes SMART indicators for each expected outcome as well as end-of-project targets. These indicators along with the key deliverables and benchmarks included in Annex L will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification to track the indicators are summarized in Annex A.

The M&E plan will be reviewed and revised as necessary during the project Inception Workshop (IW) to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. General project monitoring is the responsibility of the Project Administration Unit (PAU) and Technical Support Unit (TSU) but other project partners could have responsibilities in collecting specific information to track the indicators. It is the responsibility of the Project Manager to inform Asian Development Bank of any delays or difficulties faced during implementation so that the appropriate adaptive management measures can be put in place.

The project Steering Committee (PSC) will receive periodic reports on progress and will make recommendations to Asian Development Bank concerning the need to revise any aspects of the Results Framework or the M&E Plan. Project oversight to ensure that the project meets ADB and GEF policies and procedures is the responsibility of the Asian Development Bank Task Manager. This task manager will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

Project supervision will take an adaptive management approach. The ADB along with UNEP (Task Manager for Asia Pacific) will be responsible for the project supervision. UNEPs will develop a project Supervision Plan at the inception of the project, which will be communicated to the PAU and TSU and the project partners during the Inception Workshop. The emphasis of the supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring.

Progress vis-à-vis delivering the agreed project global environmental benefits will be assessed with the Steering Committee at agreed intervals. Project risks and assumptions will be regularly monitored both by the PAU and TSU, the project partners and ADB. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The PIR will be completed by the Project Manager and Technical Coordinator and ratings will be provided by ADB Task Manager in close cooperation with the UNEP Task

Manager. The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. ADB's Task Manager will have the responsibility of verifying the PIR and submitting it to the GEF. Key financial parameters will be monitored for Component 1,2, and 4 quarterly to ensure cost-effective use of financial resources.

Since this is a Full-Size Project (FSP), resources are set aside for a Mid-Term Review (MTR) which will take place between Months 12 and 15 during project implementation. The MTR will provide an assessment of project performance prior to mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way.

An independent Terminal Evaluation (TE) will be undertaken before or at the time of project completion. ADB Evaluation Office will manage and take the lead for the TE, which will conform to the GEF IEO Evaluation Policy and ADB's policy and practice with respect to independent evaluations for GEF co-financed TA projects. ADB will liaise with the UNEP Evaluation Office throughout the process. Key decision points in the evaluation process will be made jointly by both Evaluation Offices in a collaborative manner [finalisation of Evaluation ToRs, selection of evaluation consultants, review of draft report and acceptance of final reports]. The TE report will be sent to project stakeholders for comment. Formal comments on the report will be shared by the Evaluation Offices in an open and transparent manner. The evaluation report will be publicly disclosed and may be followed by a recommendation compliance process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness, and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among ADB, UNEP, GEF, executing partners and other stakeholders.

The GEF Core Indicator Worksheet is attached as Annex F. It will be updated at mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report.

The direct costs of reviews and evaluations will be charged against the project evaluation budget. A summary of M&E activities envisaged is provided in Annex J. The GEF contribution for this project's M&E activities (including audits and evaluations) is US\$ 65,000.

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The large-scale introduction of electric mobility in India will open a new segment for locally produced vehicles. In addition, this will provide a pathway for vehicles to enter the market around the globe. Secondary market for lithium ion batteries and recycling Internal Combustion Engine (ICE) vehicles is expected to create employment opportunities in the community. It will also substantially reduce the dependency of import of raw materials for production of batteries and vehicles. The policy measures will ensure safety and health of the workers engaged in reuse and recycling of lithium ion batteries and ICE vehicles.

The transformation to Electric Vehicles system will result in public infrastructure and service cost savings, consumer savings and affordability ? particularly savings targeting lower-income households. The project will have direct effects during the project duration and impacts beyond the project duration on the GHG emissions from operation of e-mobility in India. (Please refer annexure M for more details). The key source of air pollution in transport sectors is due to widespread use of fossil fuel. With increased use of EV based transportation air quality will be improved due to reduction in emissions from pollution sources, arising from adoption of electric mobility, improved policies and enforcement of standards and regulations. Improved air quality will reduce adverse effects on health. It will substantially reduce financial impact on economy. Decreased use of fossil energy resources and its associated benefits will indirectly contribute to generating and sustaining climate change benefit.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification *

PIF	CEO Endorsement/Approval	MTR	TE
Low			

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any

measures undertaken as well as planned management measures to address these risks during implementation.

An Environment and Social Safeguards review is contained in **Annex H**.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
20-08-05 ANNEX H Environment and Social Safeguards Document	CEO Endorsement ESS	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Project Results Framework

Project Objective	Objective level Indicators	Baseline	End of project Target	Means of Verification	Assumptions & Risks
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<p>To enable the GoI and relevant stakeholders to make the transformative shift to de-carbonize transport systems, catalyse access to finance for a large-scale adoption of EV across vehicle segments and reduce air pollution in cities by promoting scale-up of electric mobility in India.</p>	<p>Cumulative amount of Direct GHG emissions reductions (in tCO₂eq)</p>	<p>0[1]</p>	<p>End-of-project target A: > 1.15 ktCO₂e by 2027 from e-2 Wheeler (considering the end of life of the vehicle as 6 years) > 9.27 ktCO₂e by 2027 from e-3 Wheeler (considering the end of life of the vehicle as 6 years) > 190.1 ktCO₂e by 2032 from e-cars (considering the end of life of the vehicle as 10 years) > Total direct emission mitigation: 201 ktCO₂e (by 2032) > Total secondary direct emission mitigation: 43,703 ktCO₂e (by 2035) > Total indirect emission mitigation: 101,973 ktCO₂e (by 2035)</p>	<p>> Project final and M&E report > GHG emissions reduction estimates based on demo and pilot monitoring reports</p>	<p>Assumption: - Please refer to Annex M for complete list of assumptions used in GHG emission reduction analysis - Government allocates adequate resources to effectively implement the policies and programmes and ensures consistency - The commitment from Government of India continues to promote EVs - Government continues to invest in increasing Renewable Energy Risk: - Change in Political leadership results in change in priorities of the Government - Disruptions in economy such as COVID pandemic affects investments in e-mobility - Resistance from OEMs due to fear of losing investments in existing manufacturing</p>
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	Increase in share of end users using low-emission transport	0	At least 10% increase per year	Project survey, Operator records	facilities hinders a investments to provide better and more competitive models to consumers
	Share of investment in low-emission transport	0	At least 5% of total investment in transport goes to low emission transport	Project survey	

Project Outcomes	Outcome level Indicators	Baseline	End of project Target	Means of Verification	Assumptions & Risks
Outcome 1: Government institutionalizes integrated e-Mobility national policy framework and facilitates effective implementation of increased e-vehicle infrastructure, including its measurement and monitoring in urban areas	Government of India endorse a national high growth integrated ZEV policy framework	No	Yes	Official Gazette, Project monitoring reports	Assumptions: - Relevant government agencies see a benefit in delivering on their mandate through policy and inter-agency coordination and support the efforts - Government entities continue to allocate adequate human resources to
	Public parking, commercial buildings, Airports Malls etc endorse Public charging Stations with a viable revenue model in place.	Not enough evidence	Evidence generated in at least 2 cities with CEMPs in Place	Official Gazette, Project monitoring reports	

for Cities	Number of CEMPs endorsed by fleet operators/ relevant stakeholders and adopted by city authorities	0	at least 2	Official documentation, Project Progress reports	<p>deliver on their respective mandate for enhancing e-mobility</p> <ul style="list-style-type: none"> - Continued focus on Air pollution reduction <p>Risk</p> <ul style="list-style-type: none"> > Frequent changes in staff and leadership of government agencies > Alignment of interest among Centre, States and City authorities on promoting e-mobility
Outcome 2: Policy for Lithium-Ion Battery (LIB) reuse and recycling and battery standards for EVs endorsed by the Government	Government of India endorse standards for Lithium Ion battery retrofitting and battery swapping for electric 2Ws and 3Ws mass adoption in cities	No	Yes	Official Gazette, Project monitoring reports	<p>Assumption:</p> <ul style="list-style-type: none"> - Continued recognition of environmental impacts of battery management by the Government and its engagement <p>Risk</p> <ul style="list-style-type: none"> - The policies and regulations are effectively implemented - The fiscal and financial policies of the Government are aligned with the environmental objectives of battery management
	Government of India endorse a policy for making LIB reuse and recycling	No	Yes	Official Gazette, Project monitoring reports	

Outcome 3: Enabling conditions for e-mobility investments created, new business models and charging infrastructure plans developed at city level	Number of city-wide EV charging network plan and business model, for different types of charging (home, office, public, commercial fleet charging hubs) is adopted	0	5	Project monitoring reports	<p>Assumption:</p> <ul style="list-style-type: none"> - Continued mandate for EESL in promoting E-mobility - Private sector and Financing institutes see a business and economic opportunity in e-mobility <p>Risks</p> <ul style="list-style-type: none"> - Sufficient interest generated in commercial passenger fleet users - Interest of financing institutions in e-mobility segment
	A financial mechanism to facilitate the scaling-up of low-carbon electric mobility is approved (or operationalized)	No	Yes	Project documentation	
	Number of city authorities and fleet operators adopting new business models for electric vehicles in commercial fleet applications	1	3	Project documentation	
Outcome 4: Demand for e-vehicles stimulated through increased capacity and awareness among government, consumers and private sector stakeholders on the benefits and	The national coordination body on e-mobility generates best practices and lessons learned on low-carbon electric mobility, stimulating demand for e-vehicles	Inadequate evidence	Evidence generated	Evaluation reports, Project survey	<p>Assumption</p> <ul style="list-style-type: none"> - Partner government agencies complement the project resources for implementing project activities specially creation of awareness - Continued support and

business opportunities for accelerating electric mobility uptake	Accelerated e-Mobility uptake based on increased awareness of sustainable low-emission transport options among end users	Inadequate evidence	Evidence generated	Survey conducted under the project	participation of stakeholders in project efforts
	Public transport policy makers and transport staff and officials trained, leading to enhanced decision making for adoption of EVs	n/a	Evidence generated in 5 cities	Minutes of the training, Training modules and reports	

[1] EV adoption is happening albeit it is still at nascent stage. The baseline is considered to be zero to indicate the incremental benefits from the project.

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Please refer to the separate pdf file which includes all responses to the GEF Secretariat's comments to the PFD.

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: US\$ 68,808 (UNEP)			
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (US\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent to date</i>	<i>Amount Committed</i>
GEF Expert	26,000	26,000	
E vehicle Expert	25,000	25,000	
Missions and Consultation workshop	12,000	12,000	
Contingency Funds	5,808	0	5,808
Total	68,808	63,000	5,808

PPG Grant Approved at PIF: US\$ 68,808 (ADB)	
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (US\$)</i>

	<i>Budgeted Amount</i>	<i>Amount Spent to date</i>	<i>Amount Committed</i>
Preparation of GEF CEO Endorsement Document	68,808*	0	68,808
Total	68,808	0	68,808

* ADB has not drawn down on the available PPG funds (\$68,808 excluding Agency Fee). These funds will be used during project implementation in support of activities under Output 3.1. More specifically this would focus on EV fleet operators and end users for 2w, 3w and/or 4w segments, and include such activities as preparation of terms of reference for pre-feasibility studies, feasibility studies, technical and scientific design parameters, and/or additional gender analysis.

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

A list of cities has been identified however the selection of cities will be done during implementation stage. The probable city options as has been indicated are Delhi, Pune, Mumbai, Chennai, Hyderabad, Bangalore, Kolkata, Ahmedabad, Agra. These are depicted on the map below:

Map of India



ANNEX E: Project Budget Table

Please attach a project budget table.

Annex I.1: Indicative Project Budget Template

[illegible]

Grants/ Sub-grants	Transfer and Grants to implementing partner for Mid term and end term evaluation						65,000		65,000	EESL
	Transfer and Grants to local implementing partner	64,000				64,000			100,000	Niti Aayog
	Transfer and Grants to Implementing partner for Investment in Pilot projects (2W and 3W pilots)			1,795,093		1,795,093			1,778,843	EESL
Contractual Services ? Individual						0				
Contractual Services ? Company	Measurement, Reporting and Verification (MRV)			30,000	45,000	75,000			75,000	EESL, Niti Aayog
	Training and Capacity Building	40,000	30,000		40,000	110,000			110,000	Niti Aayog
	Development of Applications, Tools, Websites, KPIs, Engagement Platforms, etc.	120,000			120,000	240,000			240,000	Niti Aayog

	Development of Comprehensive e-Mobility Plan (CEMP) for selected 2 cities	170,500				170,500			150,000	EESL
	Development of High Growth Integrated ZEV Policy Framework and Plan with year-wise roadmap and actions	150,000				150,000			170,500	Niti Aayog
	Detailed Market Assessment for setting up Lithium Ion Battery Reuse and Recycling plant in India		150,000			150,000			150,000	Niti Aayog
	Needs and Market assessment of potential commercial electric Fleet segments in upto 5 cities for electric 2W, 3W, 4W and Buses			433,750		433,750			450,000	EESL

	Development of Technical standards for retrofitting, battery swapping and battery leasing for mass adoption of electric 2Ws and 3Ws in cities		120,000	100,000		220,000			220,000	EESL, Niti Aayog
	Development of city wide EV charging network plan and business models for different types of charging in up to 5 cities			400,000		400,000			400,000	EESL

	Assessment of systematic risks and Financing needs of commercial EV Fleet Operators (2W, 3W, 4W) and challenges faced by Financial Institutions and support development of appropriate lending instruments and other financial mechanisms to attract private investors in EV Fleet in India			113,000		113,000			113,000	EESL
	Public awareness and advocacy programs				150,000	150,000				Niti Aayog
	Training from Global Programme to Support Countries with the Shift to Electric Mobility				40,000	40,000			150,000	Niti Aayog
						0				
	Survey	12,000	12,000		12,000	36,000			134,563	Niti Aayog
	Financial Audit by Executing Agency					0				
International Consultants	?					0				

Local Consultants	National Project Director					0				
	Project Manager					0				
	Sr. Technical Coordinator	60,000	20,000		40,000	120,000			120,000	Niti Aayog
	Technical Coordinator	40,000	8,000		24,000	72,000			72,000	Niti Aayog
	Social and Gender Specialist (National)	30,000	10,000		30,000	70,000			90,000	Niti Aayog
	Marketing Communications Specialist (National)	52,000	12,000		10,000	74,000			52,000	Niti Aayog
	Legal Specialist (National)	12,000				12,000			12,000	Niti Aayog
	Procurement and Finance Assistant			32,000		32,000			32,000	EESL
	Administration Assistant 2					0				
Salary and benefits / Staff costs	Project Manager					0		98,000	98,000	EESL
	Administration Assistant 1					0		24,000	24,000	EESL
	Procurement and Finance Assistant					0		32,000	32,000	EESL
	Administration Assistant 2					0		24,000	24,000	EESL
	Financial Audit by Executing Agency					0		12,000	12,000	EESL

Trainings, Workshops, Meetings	Stakeholder consultation meetings & workshops (Including regional workshops; training and workshops for other cities/states ; training of technicians for maintenance and repair of e-vehicles)	55,000	20,000	40,000	40,000	155,000			135,000	EESL, Niti Aayog
Travel	Travel for stakeholder consultation meetings and workshops	35,000	10,500	16,000	50,063	111,563		16,000	82,000	EESL, Niti Aayog
	Travel for consultants	10,000	8,000	8,000	10,000	36,000		8,000	44,000	EESL, Niti Aayog
	Travel for attending global programme workshops	35,000	22,500	18,000	35,000	110,500		17,570	101,070	EESL, Niti Aayog
						0				
Office Supplies	Reports, documentation and publications	20,000	20,000	10,000	20,000	70,000		12,000	82,000	EESL, Niti Aayog
	Office supplies	10,000	10,000	6,000	10,000	36,000		12,000	48,000	EESL, Niti Aayog
Other Operating Costs	?					0				
	?					0				
Grand Total		915,500	453,000	3,001,843	676,063	5,046,406	65,000	255,570	5,366,976	

[1] In exceptional cases where GEF Agency receives funds for execution, Terms of Reference for specific activities are reviewed by GEF Secretariat

ANNEX I-2: DETAILED CO-FINANCE BUDGET

No .	Co-finance partner		Nature of co-finance		Co-finance contribution per project Component in US\$				Total in US\$	Description of co- finance contributio ns <i>(in line with co-finance letters received from partners)</i>
	Name	Source	Type	Investme nt Mobilized	C 1	C 2	C3	PM C		

1	Asian Development Bank	GEF Agency	Loan	Investment mobilized			31,800,000		31,800,000	<p>ADB approved a new loan, "Scaling Up Demand-side Energy Efficiency Sector Project" with \$250 million financing, to target upstream energy efficiency opportunities, including deployment of smart meters, distributed solar photovoltaic systems and e-vehicles in at least 15 states across India.</p> <p>Part of this loan (around \$ 31.8 million) will contribute to commissioning additional 2000 4W e-vehicles and e-charging stations to improve transport efficiency, reduce fossil fuel consumption and improve energy security. Part of the loan will also support capacity building, raising end-user awareness and gender mainstreaming.</p>
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2	Energy Efficiency Services Limited	Recipient Country Government	Equity Investment	Investment Mobilized			129,100,000		129,100,000	EESL will raise its own complementary financing of \$ 129.1 million, which will contribute towards the target of 2,000 additional 4W e-vehicles and e-charging infrastructure.
3	Energy Efficiency Services Limited	Recipient Country Government	In-Kind	Recurrent Expenditures			1,320,000		1,320,000	EESL will provide this as in-kind support attributed to the costs incurred for setting up and housing Project Administration Unit (PAU), which will manage and ensure the timely and satisfactory execution of the Component 3 and Admin Support to Component 1, 2, 4 over the 4 years of the project's implementation

4	Ministry of Housing and Urban Affairs (MOHUA)	Recipient Country Government	In-Kind	Recurrent Expenditures			500,000		500,000	MoHUA will help support selection of cities for CEMP and provide support to activities mainly under component 1 & 4 of this project
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5	Attero Recycling Private Limited	Recipient Country Government	In-Kind	Recurrent Expenditures			60,000		60,000	Attero will share its non-confidential domain knowledge with the project implementation team through participation in relevant project activities, mainly under Outcome 2 of the project. Attero will also participate in the project Technical Working Group and Project Steering Committee meetings as needed. This includes costs of travel, logistics, and time of their qualified resource specialists. In-kind, non-binding, support equivalent to \$ 60,000 can be considered as their co-financing contribution over the four-year implementation period.
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Total	-	-	162,780,000	-	162,780,000	
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ANNEX J: M&E BUDGET AND WORKPLAN

M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Inception Workshop (IW)	<p>Report prepared following the IW, which includes:</p> <ul style="list-style-type: none"> - A detailed workplan and budget for the first year of project implementation, - An overview of the workplan for subsequent years, divided per component, output and activities. - A detailed description of the roles and responsibilities of all project partners - A detailed description of the PAU, TSU and PSC, including an organization chart - Updated Procurement Plan and a M&E Plan, Gender Action Plan - Minutes of the Inception Workshop 	<p>Execution: PM</p> <p>Support: Sr. Technical Coordinator</p>	1 report to be prepared following the IW, to be shared with participants 4 weeks after the IW (latest)	GEF: as part of PM budget

M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Steering Committee Meeting	Prepare minutes for every Steering Committee Meeting.	Execution: Technical Support Unit (TSU) Support: Project Administration Unit (PAU)	At least 1 per year Minutes to be submitted 1 week following each PSC meeting	GEF: as part of PM budget
Project Implementation Review (PIR)	Analyzes project performance over the reporting period. Describes constraints experienced in the progress towards results and the reasons. Draws lessons and makes clear recommendations for future orientation in addressing the key problems in the lack of progress. The PIRs shall be documented with the evidence of the achievement of end-of-project targets (as appendices).	Execution: PM (C3 and overall compilation) and ADM TM Support: Sr. Technical Coordinator (C1, C2, C4)	1 report to be prepared on an annual basis, to be submitted by 15 July latest	GEF: as part of PM budget
Half-yearly progress report	Part of Asian Development Bank requirements for project monitoring. - Narrative of the activities undertaken during the considered semester - Analyzes project implementation progress over the reporting period. - Describes constraints experienced in the progress towards results and the reasons.	Execution: PM Support: Sr. Technical Coordinator	half-yearly progress reports for any given year, submitted by January 31 (latest) for period 1 st July ? 31 st December of previous year	GEF: as part of PM budget

M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Quarterly expenditure reports	Detailed expenditure reports (in excel) broken down per project component and budget line, with explanations and justification of any change	Execution: PM and Finance Assistant Support: Sr. Technical Coordinator	Four (4) quarterly expenditure reports for any given year, submitted by January 31, April 30, July 31 and October 31 (latest)	GEF: as part of PM budget
Annual Inventory of Non-expendable equipment	Report with the complete and accurate records of non-expendable equipment purchased with GEF project funds	Execution: PM Support: Sr. Technical Coordinator	1 report per year as at 31 December, to be submitted by 31 January latest	GEF: as part of PM budget
Co-financing Report	Report on co-financing (cash and/or in-kind) fulfilled contributions from all project partners that provided co-finance letters.	Execution: PM Support: Sr. Technical Coordinator, Co-finance partners	1 annual report from each co-finance partner, and 1 consolidated report, to be submitted by 31 July latest	GEF: as part of PM budget
Medium-Term Evaluation (MTE) / Medium-Term Review (MTR)	The purpose of the MTE or MTR is to provide an independent assessment of project performance at mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. It will verify information gathered through the GEF tracking tools.	Execution: Independent Evaluator / ADB/UNEP TM Support: PAU, TSU	At mid-point of project implementation if deemed needed by the Task Manager	GEF: US\$ 25,000

M&E Activity	Description	Responsible Parties	Timeframe	Indicative budget (USD)
Final Report	<p>The project team will draft and submit a Project Final Report, with other docs (such as the evidence to document the achievement of end-of-project targets).</p> <p>Comprehensive report summarizing all outputs, achievements, lessons learned, objectives met or not achieved structures and systems implemented, etc. Lays out recommendations for any further steps to be taken to ensure the sustainability and replication of project outcomes.</p>	<p>Execution: PM/PAU</p> <p>Support: Sr. Technical Coordinator/TSU</p>	Final report to be submitted no later than three (3) months after the technical completion date	GEF: as part of PM budget
Terminal Evaluation (TE)	<p>Further review the topics covered in the mid-term evaluation.</p> <p>Looks at the impacts and sustainability of the results, including the contribution to capacity development and the achievement of global environmental goals.</p>	<p>Execution: Independent Evaluator / ADB/UNEP TM</p> <p>Support: PAU, TSU</p>	Can be initiated within six (6) months prior to the project's technical completion date	GEF: US\$ 40,000
TOTAL M&E COST				GEF: US\$ 65,000

ANNEX F: Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

ANNEX G: Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agency's is

required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

ANNEX H: Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies' capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).